

SUMMER 2007

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Sports Medicine
at The CORE
Institute

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“Right after the operation, I felt that it had been a success... I have my life back again.”

Cindy Goodfellow, 64
Stryker Knee Recipient, 2005

Cindy Goodfellow from Temple, Texas, experienced the benefits of Triathlon® firsthand. An active senior with six grandchildren, Goodfellow's arthritis affected her knees so severely that she had trouble performing routine activities.

“Every time I climbed, stood, or even sat in one place for a while, the pain was excruciating,” said Goodfellow. “I felt like I was living a part-time life.” She knew that she needed to take action before her pain forced her to miss the things she enjoyed most.

After consulting with her physician on possible treatments, Goodfellow decided to undergo surgery and receive a Stryker Triathlon® knee replacement.

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“At first, knee replacement surgery seemed like a scary procedure,” said Goodfellow. “But after receiving the Triathlon and having the ability to do things like kneeling in the garden and playing with my grandkids, I can't envision my life any other way.”

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The results and lifetime of joint replacement surgery vary depending on age, weight, activity levels, etc.

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David Jacofsky, MD

to come





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PHYSICIAN SPOTLIGHT



A. Martin Clark Jr., MD

A. MARTIN CLARK JR., MD

Dr. A. Martin Clark Jr. is a sports medicine and hip arthroscopy specialist with concentrated expertise in shoulders, hips and knees. Dr. Clark is the only fellowship-trained hip arthroscopist in Arizona and has extensive experience treating many patients with hip problems, including professional athletes in the fields of tennis, ice hockey, football, dance and soccer.

Dr. Clark began a prestigious academic record with the receipt of his bachelor's degree in biology, *cum laude*, from Harvard University. There, he received the 1993 Ivy League Academic Athlete of the Year award. Dr. Clark then received his medical degree from Columbia University. Continuing at Columbia, he completed his internship and residency in orthopedic surgery at the New York-Presbyterian Hospital, where he was nominated as the Arnold P. Gold Resident of the Year. Following his residency, Dr. Clark completed a sports medicine fellowship at the famed Steadman Hawkins Clinic in Vail, Colorado.

Throughout his educational career, Dr. Clark has participated in team coverage of several sports teams, including Columbia University athletics, the Denver Broncos, Eagle Valley football, the Vail Ski Club, the Colorado Rockies, and the U.S. men's and women's ski teams.

In addition to dedicating his time to sporting-event coverage, Dr. Clark also devotes his time and talents to developing and ensuring the growth of the local community. He currently provides team coverage and education for high school athletics at Valley Vista and Willow Canyon High Schools in the Dysart school district. He also lectures to athletic trainers, physical therapists and the greater community about the latest techniques and updates in sports medicine and hip procedures.

As a former professional squash player, four-time U.S. national champion and two-time Pan-American Games medalist, Dr. Clark cares for his patients as both a passionate athlete and an experienced, dedicated physician.



by John Brown, MD

Sports Medicine at The CORE Institute®

As athletes, we challenge ourselves every day. Athletic endeavor — whether it's a Friday-night softball game, a doubles tennis match, a weekend triathlon or a pickup basketball game — is what keeps us vital. Competition provides us the forum to challenge ourselves against one another or the elements. Inevitably, many of us involved will experience an injury, and typically, the injury is treated with rest and a brief period of time off. Sometimes, however, the injury requires further attention and more specialized care. That's when it's time to see a Sports Medicine specialist.

Sports Medicine is the discipline of medicine that involves the prevention and treatment of injuries occurring within the realm of athletic endeavor. The goal is to provide for the well-being of our patients, always striving to allow each to reach his or her full potential. It encompasses critical decision-making to proceed with nonoperative versus operative intervention. In both scenarios, whether it is an immediate referral or one that follows a surgical intervention, the care progresses to the rehabilitation side of the recovery process, as rehab is a critical component in the patient's return to sport.

In a broader sense, Sports Medicine encompasses the care of the athletic team, from Little League to the professional ranks. It focuses on providing specialized medical coverage at athletic events, volunteering at community sporting events, organizing and overseeing pre-participation physicals, and educating the community, coaches, children and those who serve the public (such as firefighters) on injury prevention and treatment. The discipline of Sports Medicine also involves contributing to the advancement of science and technology as it relates to the care of the athlete, ultimately optimizing performance, minimizing injury, and refining surgical techniques and devices, thus speeding recovery to get the athlete back in the game.

Physical Therapy and Occupational Therapy

Vital to an expeditious and full recovery following an injury or a surgery is a comprehensive rehabilitation program. Without sound and effective rehab, an injury may languish, or a post-operative course may be prolonged unnecessarily. At The CORE Institute, we have created a unique relationship between physicians and physical and occupational therapists. On site at our Sun City West and Peoria offices, the therapists and doctors work side by side, as the actual PT/OT facility is just doors down from the physicians' clinic. The design facilitates patient care by having direct physician-therapist interaction to discuss a patient's ongoing needs, concerns and progress. Any issue regarding care is immediately addressed, and concerns are quickly and correctly resolved.

Another part of the relationship between our physicians and rehab team are rehabilitation protocols. A significant problem that exists in the community is the lack of standardization of rehab protocols for given injuries or surgeries. At The CORE Institute, doctors and therapists have worked together to create evidence-based, standardized rehab protocols. With both the physician and therapist contributing to the protocols, all details are covered. With all the best equipment at their disposal, patients receive the ultimate in rehabilitation, optimizing their goals of returning to sport at their full capacity.



Community Involvement and Outreach

At the foundation of The CORE Institute is its involvement in the community through various outreach programs. Each and every one of our CORE Sports Medicine physicians is actively involved in numerous programs.

Each spring and fall, The CORE Institute sponsors an educational program entitled "Prevention and Treatment of Injury in the Youth Athlete." The focus is directed at injury prevention and teaches athletes, coaches, and parents vital concepts in the care of the youth athlete. This past fall, the lecture was held at Dysart High School. Coaches from the local community, athletic trainers, parents and players were all in attendance to learn the latest on the subject.

This year marks the inaugural kickoff to the Arizona Sports Medicine Society. The CORE Institute founded the society to provide a forum to disseminate ideas and provide continuing education opportunities to those involved in and interested in furthering the care of the athlete. Most recently, several of our physicians provided lectures on new techniques in anterior cruciate ligament reconstruction and shoulder injuries in the throwing athlete.

We are also very proud of our first annual sports-focused regional educational conference. The April 2007 "Care of the Athlete: From Trainer to Physician" lecture series was a great success, as we covered a broad range of topics from concussion management to prevention and treatment of ACL injuries. The conference was held coincident with the annual Arizona Football Coaches Association meeting. This enabled us to also provide educational opportunities to more than 400 coaches from around the state on several "hot topics," as selected by the coaches themselves. Proceeds were donated back to the Arizona Football Coaches Association to assist them in maintaining this critical organization, so we look forward to an even more successful event next year.

Research

From the inception of The CORE Institute, we have valued research as a vital component to a center of excellence in orthopedics. Critical to our ability to further orthopedic knowledge was to house our own investigative components. As a result of this vision, The CORE Institute features the most advanced state-of-the-art motion-analysis and gait-analysis lab in the state of Arizona. Here, we can analyze any action of the human body, such as running, cutting, pitching, swinging or jumping, using a series of specialized cameras that can detect motion to 0.1 millimeter. This allows us to identify weaknesses in a golf swing or a poor landing technique that may predispose a young athlete to a knee injury. It can also help us determine the most stable repair technique in an ACL reconstruction or the most reliable means of bracing in athletes with an ankle sprain.

Another critical part of the vision is our biomechanical testing lab. The lab houses machines that simulate normal joint motions. We can develop and test devices that are used to reconstruct human joints to create better, more durable and longer-lasting products. Ultimately, the goal is to provide the patient with the optimum product for any given orthopedic procedure.

We are very proud of our research facilities and the opportunity they afford. Several of our clinicians have already submitted research papers and are actively pursuing ongoing research projects.

Professional Sports

One of the highlights of springtime in Arizona is the Arizona Cactus League. Every spring, the major-league hopefuls gather in Arizona. The CORE Institute has served as the Phoenix-based team physicians for the Texas Rangers major-league baseball club since CORE's inception nearly three years ago. It is an exciting part of our career and a unique opportunity to not only care for the professional athlete but also to be intimately involved in the sport during such a critical time.

We also are the orthopedic team physicians for the Arizona Sting. The Sting is Arizona's representative in the professional lacrosse league. This year, the team made it all the way to the championship, and the CORE Institute was with them every step of the way. We are proud to be part of such an outstanding organization with such dedicated athletes.

Our Team

The CORE Institute Sports Medicine team is composed of fellowship-trained experts from throughout the country and the world. While each physician brings unique degrees of specialized training in multiple areas of Sports Medicine, we each share the common goal of ultimate patient care. We are proud of our committed group of physicians:

John A. Brown, MD

- Undergraduate degree: James Madison University
- Medical degree: Howard University College of Medicine
- Fellowship: Santa Monica Orthopedic and Sports Medicine Group

A. Martin Clark Jr., MD

- Undergraduate degree: Harvard University
- Medical degree: Columbia University
- Fellowship: Steadman Hawkins Foundation

Richard Emerson, DO

- Undergraduate: University of California, Riverside
- Medical degree: University of Health Sciences
- Fellowship: Cleveland Clinic Foundation

Matthew L. Hansen, MD

- Undergraduate degree: Cornell University
- Medical degree: University of Utah School of Medicine
- Fellowship: Kerlan-Jobe Orthopaedic Clinic

John Kearney Jr., MD

- Undergraduate degree: Arizona State University
- Medical degree: University of Arizona
- Fellowship: Hennepin County Medical Center

Jeffery R. Lyman, MD

- Undergraduate degree: Occidental College
- Medical degree: University of Washington
- Fellowship: North Sydney Sports Medicine Institute

Stacey McClure, MD

- Undergraduate degree: University of Arizona
- Medical degree: University of Arizona
- Fellowship: University of Arizona

John Thompson, DO

- Undergraduate degree: Bethany College
- Medical degree: Kirksville College of Osteopathic Medicine
- Fellowship: The CORE Institute

The Future

The CORE Institute Sports Medicine team is dedicated to becoming the leaders in sports care locally, regionally, nationally and internationally. We are rapidly moving forward by providing state-of-the-art care, research, community service and continuing education. We look forward to caring for your needs. *Keep life in motion.*

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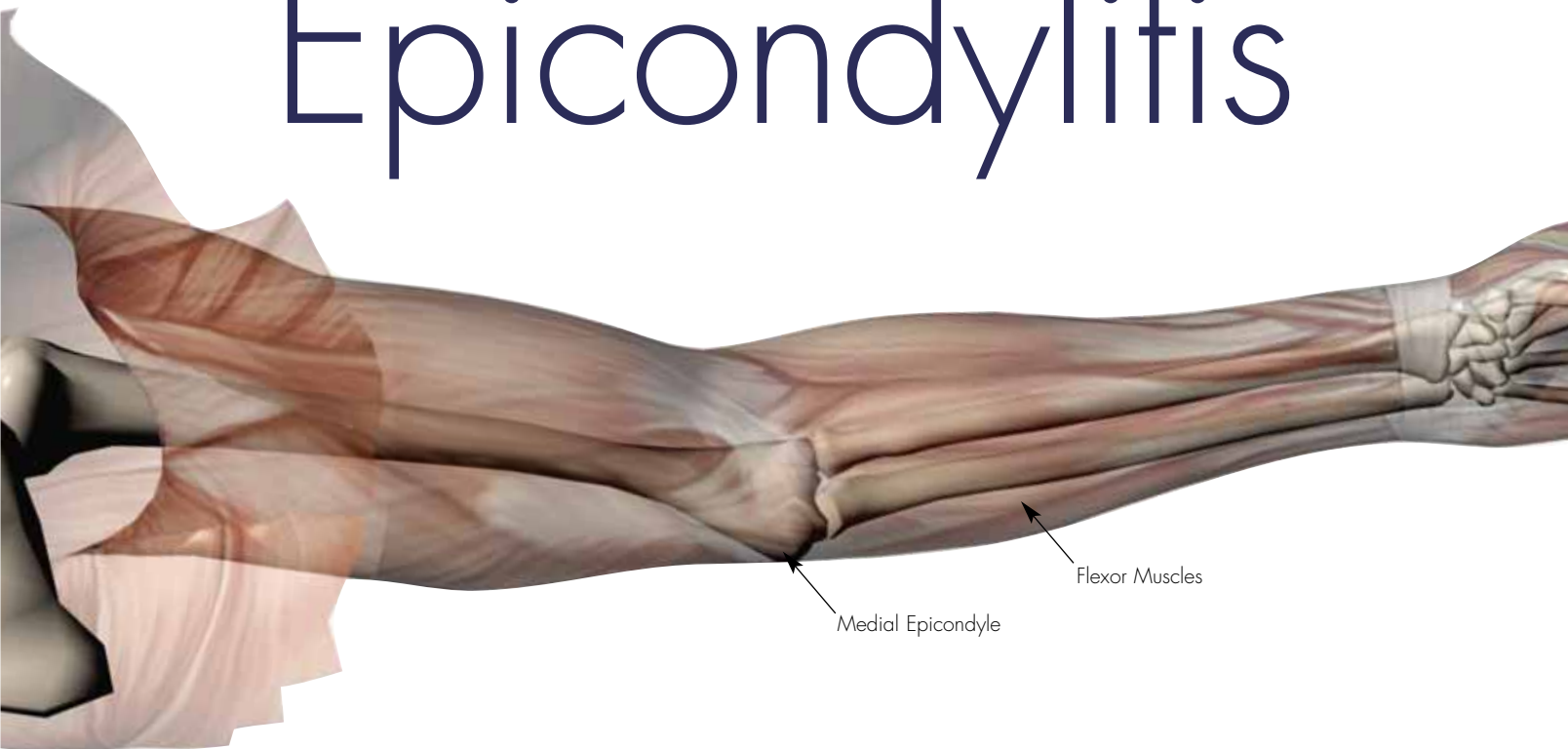
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Epicondylitis



Tennis Elbow and Golfer's Elbow

by Stacey McClure, MD



With the beautiful weather that the Southwest enjoys year-round, many residents — young and young at heart — can be found beating their competition on the hard surfaces of a tennis court or beating themselves on the lush greens of one of the many premier golf courses around town. Unfortunately, the zeal of our health-conscious population can lead to a plethora of overuse injuries, particularly in the elbow. Lateral and medial epicondylitis, more commonly referred to as “tennis elbow” (lateral) and “golfer’s elbow” (medial), are the most common forms of overuse injuries in the elbow.

Tennis elbow and golfer's elbow are painful and sometimes debilitating conditions of the elbow. They are thought to be caused by repetitive stressful forces applied to the structures around the elbow that help to flex and extend the wrist and stabilize the elbow joint. Symptoms include pain and weakness and are not just limited to athletes. These symptoms can be experienced by anyone subjected to repetitive hand, wrist and elbow use. Treatment options range from simple rest to surgery and intervention, which can produce dramatic results.

Tennis Elbow

Tennis elbow was first described in 1882 and focused mainly on medial elbow pain. It was termed “lawn-tennis arm,” due to a prevalence of the symptoms in tennis players, and it eventually grew to include lateral findings. Today, tennis elbow describes pain located on the thumb side of the elbow when the palm is facing up. The maximal point of tenderness is two to five millimeters distal and anterior to the lateral epicondyle. The pain is exacerbated by resisted extension of the fingers and wrist when the elbow is fully extended. The source of the pain is believed to be micro-tears in the extensor mass attached to the elbow. The most commonly affected muscle tendon is the extensor carpi brevis.

Repetitive tearing of the tendon leads to deposition of disorganized scar tissue termed “angiofibroblastic hyperplasia.” Normally, elbow and wrist range of motion are not limited, and sensation is unaffected. However, some may experience weakness related to the pain.

Symptoms commonly occur in the fourth and fifth decade of life and tend to affect men and women equally. Research indicates 75 percent of patients will have pain in their dominant arm. Estimations predict 10 percent to 50 percent of people who play tennis will eventually have symptoms consistent with tennis elbow. Studies correlating playing time to risk show those who play tennis more than two hours a week are two to 3.5 times more likely to develop tennis elbow than those who play less than two hours per week. Men older than 40 are four times more likely to have symptoms than younger players. Women older than 40 have twice the risk of tennis elbow than younger women have.

Causative factors associated with tennis related to the racket include improper grip size, racket weight and tight stringing. Poor stroke technique, such as leading with a flexed elbow and not hitting the ball with the center of the racket, also lead to increased forces across the elbow. Even hard courts have been linked to tennis elbow, due to the increased velocity of the ball coming off of the hard surface.

Tennis elbow is not restricted to tennis players. Other recreational activities with elevated risk for the condition include squash, racquetball and fencing. Occupational hazards are common in professions involving frequent painting, meat cutting, plumbing and raking. More recently, instances of the condition in professions requiring frequent fine hand-motor function, such as computer use and typing, have become more prevalent.

Natural-history studies of disease progression suggest most tennis elbow symptoms will improve with rest and avoidance of aggravating activity. Therefore, initial treatment is centered on stopping the painful activity, icing to reduce swelling, and taking anti-inflammatory medication. The use of corticosteroid injections directly into the painful region is advocated by some for those who fail initial treatment, and they have been shown to provide pain relief in 50 percent to 90 percent of patients. However, recurrence of pain can be as high as 50 percent. Steroid use has also been associated with atrophy of subcutaneous fat, changes in skin pigmentation and adverse changes in tendon structure. Therefore, the pros and cons of steroid use should be discussed judiciously with the treating physician. While complete immobilization has largely fallen out of favor, counterforce bracing, which is meant to decrease muscle excursion limiting the force imparted to the tendon, has shown some benefit.

Surgical treatment is reserved for those who have failed attempts at conservative management for a period of three to 12 months. A variety of surgical techniques exist, but most involve the release of the painful tendon, debridement of disorganized tissue and stimulation of the healing response. Reports suggest that up to 90 percent of patients with surgical treatment experience pain relief. However, more than 30 percent may experience weakness, especially with gripping maneuvers.

All forms of treatment should include a guided rehabilitation program and behavioral modification once the initial pain and inflammation have subsided. Behavioral changes for tennis athletes include modification of stroke technique, such as using a two-handed backstroke and hitting the ball in front of the body with the forehand stroke to shift forces from the wrist extensors to other parts of the body. In addition, using lighter rackets with low-vibration frames, a higher string count or less-tightened strings and the proper grip size — as well as playing on slower surfaces, such as clay courts — will help diminish the risk of tennis elbow.

Golfer's Elbow

Despite its name, golfer's elbow is more commonly seen in pitchers and other overhead-throwing athletes. Much of what is known about medial epicondylitis (golfer's elbow) is derived from studies examining the biomechanics of pitching. Golfer's elbow is a term applied to pain located on the small-finger side of the elbow when the palm is facing up. The maximal point of tenderness is distal and lateral to the medial epicondyle of the elbow. The pain is made worse by resisted wrist flexion and forearm pronation. The pain is thought to be caused by micro-tears in the wrist flexors and pronators attached to the medial side of the elbow (fig. 2) due to severe valgus (outward) forces on the elbow. The pronator teres and the flexor carpi radialis muscle tendons are most commonly implicated in golfer's elbow. Studies have shown repetitive tearing and fatigue of these tendons can compromise the medial collateral ligament, leading to elbow instability. Like tennis elbow, range of motion and sensation generally are not affected. However, irritation of the ulnar nerve is often concomitant with golfer's elbow and can negatively impact prognosis. When exploring medial elbow pain, primary ulnar neuritis and primary elbow instability must be considered.

Golfer's elbow is up to 20 times less common than tennis elbow. Symptoms also occur in the fourth and fifth decades of life and tend to affect men and women equally. Baseball-pitching, rowing, serving in tennis and javelin-throwing are all sports with a high occurrence of





medial epicondylitis. Risks are increased with bricklaying, typing and hammering occupations. Symptoms are related to poor technique, inadequate warm-up exercises and lack of overall conditioning, all of which lead to increased load on the pronator mass and medial ligaments of the elbow during valgus stress.

Initial treatment for golfer's elbow is very similar to treatment for tennis elbow. This includes rest, icing to reduce swelling, anti-inflammatory medications and avoidance of aggravating factors. Steroid injections pose the same risks as with tennis elbow and should be cautiously applied. Counterforce bracing has shown some benefit but is not as commonly prescribed as in tennis elbow. Secondary treatment is focused on equipment modifications and improving performance techniques. Post-rehabilitation performance programs that enhance the technical aspects of pitching and serving prior to return to play have proven to be helpful. Rehabilitation is centered on overall conditioning and strengthening and should include stretching and progressive isometric exercises for the pronator teres and wrist flexors.

Surgical treatment is considered for those who have failed six to 12 months of conservative measures and for whom other causes of the symptoms, including primary ligamentous instability, ulnar neuritis, and cervical radiculopathy, have been excluded. As with tennis elbow, many surgical techniques exist, but most involve releasing the flexor pronator mass, debriding the offending bone, and reattaching the tendons to a vascular bed. Results following surgical treatment have

been favorable, with more than 90 percent of the patients experiencing pain relief. Strength deficits, while concerning, have not shown to be as significant a problem as with surgical treatment for tennis elbow. Results are not as encouraging, however, for patients with concomitant ulnar neuritis. Many of these patients never experience complete relief of pain or numbness.

Summary

Chronic overuse injuries of the elbow can inflict severe pain and debilitation for both athletes and persons in occupations that impart compounding stresses to the elbow in a repetitive nature. Tennis elbow and golfer's elbow are common forms of epicondylitis, affecting tendons and ligaments on the lateral and medial sides of the elbow respectively.

Treatment of overuse injuries remains largely conservative with rest, anti-inflammatory medications and avoidance of aggravating factors. The conservative approach has great success with more than of 90 percent of the patients reporting good to excellent results. Adjuvant treatment, such as counterforce bracing, can be helpful, while steroid use should be applied with caution. Surgery is considered to be a last option by most treating physicians and only after an extended period of conservative measures has failed.

Understanding the pathophysiology behind overuse injuries of the elbow has led to better treatment protocols, enabling patients to enjoy the year-round advantages of living in the Southwest.

LATEST TECHNIQUES

ACL Reconstruction



by Jeffrey Lyman, MD

Dr. Jeffrey Lyman joined The CORE Institute from Sydney, Australia, where he had been working with one of the world's busiest and well-published knee ligament surgeons, Dr. Leo Pinczewski.



ACL X-ray

The anterior cruciate ligament (ACL) is one of two ligaments located in the middle of the knee joint. The ACL acts like a rope, preventing the tibia or shin bone from popping forward on the thigh bone when a person pivots or changes directions quickly. It is frequently stressed during competitive sports.

The ACL is one of the most commonly injured ligaments in the body. In the United States alone, there are more than 100,000 ACL injuries per year. Usually, the injury results from a hyperextension or twisting injury. When the injury occurs during skiing, it is almost always after the binding fails to release. Injuries are most frequent in soccer, basketball, football, and skiing — among other sports. People usually report feeling a pop or a giving-way episode. Often, the joint slips back into place with a “clunk.” Within an hour or two, the knee swells. The swelling is a result of bleeding from small blood vessels in the ligament. These vessels initially go into spasm, but as they relax, they bleed into the knee joint.

If the injury is severe enough — as it is frequently with skiing injuries — the medial collateral ligament can be injured as well. This is often very painful and is felt on the inside of the knee joint. The outside of the knee joint may be sore as well, and this is a result of the back of the tibia contacting the front of the femur as the joint comes back into place.

The initial discomfort from an ACL injury can usually be soothed by icing, compressive wraps and the use of crutches. Sometimes, it is difficult to bear weight for several days. Eventually, the pain resolves, and joint motion returns.

The interesting thing about tearing the ACL is that many people respond differently to having the injury. Most people with ACL injuries who plan to return to sports will have episodes of instability, which can severely damage the meniscus cartilage in the knee. The meniscus acts like a shock absorber and helps to further stabilize the knee. When the meniscus is gone, arthritis can result. Skillfully reconstructing the ACL can prevent instability and meniscus injuries.

However, not all patients require the ACL to be reconstructed — even after a complete injury. Some patients don't have the type of instability or want to participate in the types of activities that lead to further knee injuries. These patients should be treated with physical therapy and observation.

The best outcomes from ACL reconstruction occur if the diagnosis can be made soon after the injury. Generally, surgery should not be performed immediately. Early rest and physical therapy will allow the knee a full, pain-free range of motion prior to surgery, dramatically speed recovery, and improve the chances of an excellent result. This will frequently take two to four weeks after the injury.

ACL reconstruction should be performed before any other injury occurs in the knee. The ACL must also be reconstructed in an anatomic fashion — meaning it should accurately reproduce the function and position of the native ACL. While there are many available techniques for reconstructing the ACL, very few allow for a reliable, anatomic reconstruction.

Some of the best outcomes in the published history of ACL reconstruction came from one clinic in Sydney, Australia. So I went there to find out why that was and what was so different there. What I found was that the technique for ACL reconstruction used there was highly evolved. We were routinely performing more than 20 ACL reconstructions a week, and sometimes as many as 40. Included in this number were nearly 50 percent of all revisions in New South Wales.

A revision surgery is what is done when a previous surgery fails. One benefit from all those revisions was that I got to see firsthand why many reconstructions done outside our clinic were failing.

The other fascinating aspect of the fellowship was the research into what factors led to an “ideal outcome” for patients. We defined an “ideal outcome” as an ACL-reconstructed knee with no symptoms whatsoever and no evidence of arthritis on X-ray 10 years after surgery. Using Dr. Pinczewski's techniques in Sydney, we were able to achieve these results in the majority of patients. There have been very few centers elsewhere in the world that have been able to show those kinds of results.

I have also been working with Dr. Pinczewski on investigating an exciting new source of graft tissue for young patients. The source of the graft tissue: a living, related donor. There are many surgeons using cadaveric tissue sources. While these sources are considered relatively safe, we feel safety can be improved further if we could directly screen and test donors. Nobody but a surgeon ever touches the grafts, and we know exactly where it has been. The tissue is also extremely high quality, as it is fresh. The clinical results from Sydney have been very encouraging. Using live donor allograft tissue for ACL reconstruction is still considered experimental, and it is not for everyone. Thus, we are continuing to pursue research to evaluate our outcomes.



Normal knee



Hip Arthroscopy

A New Frontier in Sports Medicine

by A. Martin Clark Jr., MD



by A. Martin Clark Jr., MD

Much is known to the public health consumer about all that can be done in the knee and shoulder through “the scope.” However, there remains little public awareness about the rapidly growing, minimally invasive field of hip arthroscopy. Many would argue that arthroscopic techniques have revolutionized how we approach early interventions for intra-articular pathologies. The hip is rapidly becoming an amazing new opportunity to treat patients before they develop hip arthritis and need a hip replacement.

History

The first arthroscopic clinical use of hip arthroscopy was by Takagi in 1939. However, it was not until the 1980s that the procedure became more accepted as a diagnostic and treatment tool for hip problems. In the past five years, as the techniques have been refined and new understandings of early anatomic problems of the hip have been elucidated, the field has taken a quantum leap in its ability to help patients.

Indications

The most common indications for hip arthroscopy are labral tears, loose bodies, early degenerative disease, chondral injuries, femoroacetabular impingement, impinging osteophytes, ruptured ligamentum teres, instability and unresolved hip pain. Of course, hip arthroscopy can be used to treat septic arthritis, synovial disease, recalcitrant snapping hip syndrome and adhesive capsulitis, but these diagnoses are not as common. Proper patient selection is the key to good outcomes, and patients must be aware of the limitations of this procedure. Advanced arthritis is an absolute contraindication for the procedure.

The Diagnosis

The keys to diagnosing hip problems are a history and a physical exam. Patients will notice they are developing decreased range of motion in the hip and are experiencing groin pain or pain on the outside of the hip area. A frequent misconception is that pain in the buttock area is hip pain. Most often, this is related to a back problem and/or a pinched nerve.

If a patient has decreased, painful range of hip motion, the treating physician may order an MRI or an MR arthrogram, which involves placing dye and pain medicine into the joint. The pain medicine will tell your physician he or she has the correct diagnosis of an intra-articular joint problem, and the dye helps to show problems of the labrum (lip of the joint) or cartilage. X-rays, of course, will also be routinely done in the office, as they are the best screening tool for bony pathology.

The Surgery

The surgery is done in an operating room on a table that is able to distract the joint. The hip is a tricky joint to enter and requires traction on the leg to open the hip space to enter with the small arthroscopic camera. Once the camera is in the joint, fluid is infused to help visualize the space in an aqueous environment. Another small incision is made to allow entrance of tools, such as shavers and sutures, to repair the tissues.

The Labral Tear

There are few procedures in hip arthroscopy as gratifying to the patient and the surgeon as repair of the labrum. The labrum is the cartilage lip that lines the edge of the hip joint. It is important to provide a good fit and stability for the hip joint. When it is torn, the hip is not as stable, and the tear can erode the articular cartilage of the joint. Traditionally, the torn labrum has been trimmed out of the joint. However, studies have shown repairing the tissue leads to better patient satisfaction. Most advanced hip arthroscopists now repair the labrum. It provides instant relief of the problem, and many of my patients who have been dependent on narcotic medications for the problem preoperatively are off all narcotic medications in a few days.

Loose Bodies

Loose bodies are something that can happen during trauma with a piece of cartilage being dislodged, or they can occur in certain diseases when people make many small cartilage pieces in the hip. These small, floating pieces of cartilage are like hundreds of marbles in the joint. Removing them arthroscopically is quite easy and provides rapid pain relief.

Chondral Injuries, Femoroacetabular Impingement, Early Degenerative Disease and Impinging Osteophytes

These four problems are part of the same spectrum of disease. Chondral or cartilage injury is when the articular cartilage lining of the joint is worn away. This can occur during trauma or repetitive use. When it does, the cartilage can actually be repaired with a process called microfracture, which stimulates the growth of new fibrous repair cartilage. Femoroacetabular impingement is a hot new diagnosis in the field of hip disease. It is a description of the bony problems that occur on the acetabular (cup) side of the joint and at the femoral head-neck junction on the “ball” side of the joint. This problem is frequently seen in younger, active individuals. Unfortunately, it most often goes unrecognized, since most physicians are not aware of the bony anatomic problems seen in this disease on X-rays. Active individuals with this problem are frequently told that their hips are “fine” and that they really do not have a problem. Unfortunately, individuals then try to stretch more and exacerbate the problem until they eventually have early arthritis.

Fortunately, with new arthroscopic techniques, the extra-bony osteophytes called cam lesions — locat-

ed at the head-neck junction — and the overhanging bony portions of the acetabulum can be eliminated. The early degenerative changes and the impinging osteophytes are normally related to this disease entity of impingement and, if caught early, can be crucial in preserving the native hip.

Ruptured Ligamentum Teres

The ligamentum teres provides a crucial role in blood flow in children before the age of five. As people grow older, it has a subtle stabilizing role in maintaining the femoral head in the right place in the joint. It can be torn during a trauma and can then be shaved away if it becomes painful and swollen.

Instability

Instability is a problem in many individuals. Those persons who would describe themselves as “double-jointed” are the ones we all hate to watch in yoga class, because they can do all the moves. Unfortunately, extreme flexibility comes at a cost. Many people end up with shoulder or hip problems because they stress their joints past the level of anatomic design. In the hip, this problem can be addressed with suture plication, limiting the motion of the hip at extremes.

Unresolved Hip Pain

Many people struggle with hip pain that does not seem to fit any diagnosis. MRIs are read as negative, X-rays are read as negative, and yet the individual struggles with a pain that appears to be intra-articular. In those individuals, it may be reasonable to do a hip arthroscopy to diagnose a hip pathology and treat the problem then and there.

Complications

Complications are a reality of any surgical procedure. Patients should be aware that the risks in hip arthroscopy are between 1.3 percent and 6.4 percent in published studies. Most of these complications are minor and resolve, but some may not. Even complications such as neurovascular injury and hip fractures have been reported after hip arthroscopy. To be an informed patient, it is important to know all that is involved in any procedure.

Summary

Hip arthroscopy is a new frontier in medicine. It allows early hip problems to be treated before hip replacement is the only answer. If you become concerned about hip pain or have a patient with hip pain, it is important to discuss the problem with your physician in order to undergo the right work-up and seek appropriate care.

Non-Steroidal Anti-Inflammatory Medications

The Good, the Bad and the Ugly...

Introduction



by John Kearney Jr., MD

Nonsteroidal anti-inflammatory medications (NSAIDs) are the most commonly prescribed medications in the United States. The over-the-counter use of these medications surpasses their prescription use, and there is good reason to believe demand for these medications will only continue to grow. This class of medications includes aspirin, ibuprofen, naproxen sodium, celecoxib and a host of many others. Several common brand names include Bayer, Advil, Motrin, Aleve and Celebrex.

This article will review a brief history of NSAIDs, discuss the pharmacology of the drugs (i.e., how they work), talk about indications for use within orthopedics, and discuss the controversy that surrounds this class of medications — including the gastrointestinal and cardiac risks they can pose when given to certain patients.

Historical Perspective

NSAIDs have been around for thousands of years — we just have not necessarily known it. Salicylate is a naturally occurring compound with anti-inflammatory properties that is found in the barks of many trees, such as willows, poplars and beeches. This compound was isolated and first marketed as salicylic acid (aspirin) in 1899.

During the next 100 years, many other NSAIDs were discovered and found to be quite effective for certain conditions. One example includes indomethacin used in the treatment of gout. However, it wasn't until 1999 that an NSAID came out that was dramatically different from the other NSAIDs. Members of this “new” class of NSAIDs were called COX-2 inhibitors and had the brand names of Vioxx, Celebrex and Bextra (among others). These were billed as “better and safer” NSAIDs because they were thought to have fewer gastrointestinal side effects (i.e., gave patients fewer bleeding ulcers) and were thought to do a better job at “getting rid of inflammation.”

COX-2 inhibitors gained wide acceptance from both physicians and patients and became immensely popular. Vioxx sales totaled \$1.8 bil-

lion in the first nine months of 2004 alone. Unfortunately, several large clinical trials showed Vioxx nearly doubled the risk of heart attack or stroke in some patients when they were on it long-term (absolute risk of stroke or heart attack went from 1.9 percent in a placebo group to 3.5 percent in patients taking Vioxx for two and a half years). This led to Vioxx being pulled off the market. Other COX-2 inhibitors soon followed suit, and this left Celebrex as the only one on the market.

As if the Vioxx scare did not create enough controversy, more traditional NSAIDs also began coming under fire. As a result, essentially every NSAID — with the exception of aspirin — has received much scrutiny. As it stands today, the exact science behind the risks of these medications is still incompletely understood.

Pharmacology

When tissues are injured, cells burst open and release something called phospholipids from their cell membranes. This triggers a complicated cascade of events that has been named the arachadonic acid cascade. This results in the production of chemicals called prostaglandins and leukotrienes (there are many types of these, all with different specific functions and chemical properties).

NSAIDs block an enzyme called cyclo-oxygenase that is in charge of only producing the prostaglandins (figure 1). Cyclo-oxygenase comes in two forms: cyclo-oxygenase 1 (COX-1), and cyclo-oxygenase 2 (COX-2). Each NSAID can be categorized by its relative selectivity in blocking the



COX-2 enzyme. Medications such as Vioxx were thought to be “highly selective” for the COX-2 enzyme with a relative affinity for this of 137:1, versus older NSAIDs, which had less than a 1:1 affinity (figure 2).

Additionally, COX-1 and COX-2 enzymes were thought to produce different types of prostaglandins, with COX-2 producing the ones that are most involved with tissue injury and inflammation (figure 3). However, this may not be entirely accurate, and there may be more overlap between COX-1 and COX-2 than previously thought. An example of this is represented by the utility of indomethacin in gout. If the only prostaglandins responsible for inflammation come from the COX-2 enzyme, and if indomethacin does not have a lot of COX-2-blocking capabilities, then why would indomethacin work so well at reducing inflammation?

The Good...

Understandably, the potential risks of NSAIDs have received much attention in recent years — but it is also important to remember the utility of these medications. In medicine, it is commonly said that we must consider both the potential risks and benefits when making any treatment decision. Undoubtedly, NSAIDs have several benefits. NSAIDs certainly seem to be very effective at controlling pain caused from any number of conditions that result from “pathological inflammation.” Examples include rheumatoid arthritis, gout, certain cancers, migraine headaches and menstrual cramps. Numerous trials have shown most people get superior relief of arthritic-type pain from NSAIDs than from acetaminophen (brand name Tylenol), although acetaminophen works *just fine* in many people and may be safer. NSAIDs have also been shown to offer effective pain relief if given during or after certain surgical procedures or if given after labor.

It is debatable whether or not NSAIDs are the best type of medication for what physicians call “delayed-onset muscle soreness.” This is the type of pain people experience within one to two days after “overusing” their muscles. Inflammation may be important in healing the muscles and allowing them to return to their normal structure and function. However, for the weekend warrior who is other-

wise healthy and who does not have any contraindications to these medications, NSAIDs may be a very effective treatment for mild to moderate muscle pain if used for a few days after “overdoing it.”

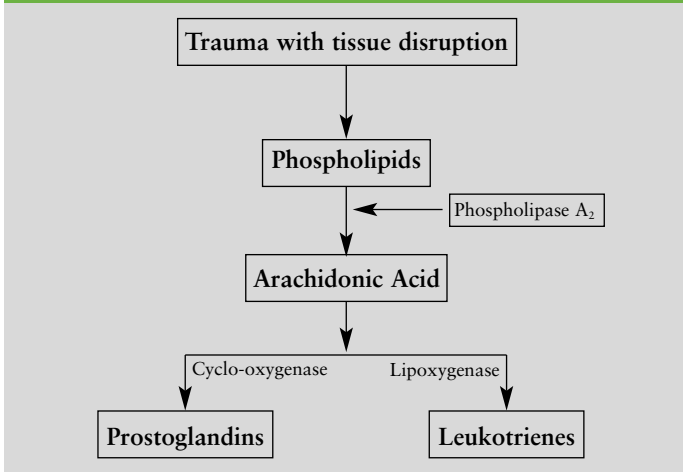
As to the specific NSAID to recommend, one has not has proven vastly superior to another when studied in large groups of people, but it has been the author’s experience that there can be a huge variation in individual response to the different types of NSAIDs (i.e., someone might respond very well to naprosyn and not at all to ibuprofen, or vice versa).

The Bad...

Just about every type of medication has potential side effects. For unclear reasons, NSAIDs have generally been thought of as being very “benign” and safe medications. While this might be true for most patients, there are certainly many potentially dangerous side effects for others. Because there is a general attitude that NSAIDs are safe medicines, they tend to be overprescribed to all patient populations, including those at high risk for side effects. The indiscriminate use of these medications can cause a host of serious problems — especially when taken for extended periods of time. These problems will be discussed below.

The author believes another major problem with these classes of medications is that it gives patients and physicians alike an *easy* treatment option that is not necessarily (and only rarely) the *best* treatment option. In most cases, it is much quicker and less complicated to take a pill for a painful condition in order to “cover up symptoms” rather than to correct the underlying cause that is creating the symptoms. One example of this is for osteoarthritic (wear-and-tear-type arthritis) knee pain. In people with mild to moderate symptoms, their have been numerous studies showing the vast majority of people can improve their symptoms significantly by doing some simple exercises to strengthen the upper leg and buttock muscles. In most cases, they can gain further relief by losing just a few pounds (even one pound of weight loss translates to three to five fewer pounds on the knees). However, this option is not utilized nearly as often as is the prescription of NSAIDs.

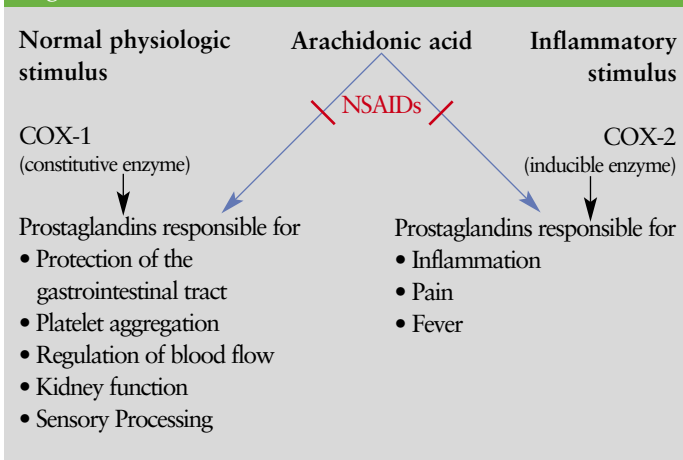
Figure 1



Along the same lines, many conditions that have traditionally been characterized as “tendonitis” are also commonly treated with NSAIDs. These conditions include problems such as Achilles tendonitis, shoulder bursitis, lateral epicondylitis (tennis elbow) or plantar fasciitis. The rationale has always been that these are “inflammatory” conditions, and therefore, it stands to reason that people should take “anti-inflammatory” medications to treat them. This would make perfectly good sense, except for the fact that in recent years, investigators have found these chronic conditions are not inflammatory at all. In fact, tissue biopsy samples have shown hardly any inflammatory markers and instead show only weak and degenerative tissue. The best treatment for these conditions is appropriately directed therapy aimed at relieving the stress placed on the injured tissue. More often than not, this involves a specific strengthening program directed at the particular problem.

An area of ongoing research is how NSAIDs may impair the rate and ultimate strength of bone, tendon, and ligament healing. There are many animal studies showing impaired healing of these tissues following acute injury when animals are given NSAIDs. There is some evidence in humans that NSAIDs may cause higher rates of non-union in some types of broken bones (non-union is when the bone does not grow back together). This may be especially true in certain stress fractures. However, the vast majority of broken bones in humans heal very well even if NSAIDs are taken.

Figure 2



The Ugly...

Consider this informed consent. If you are taking these medications or prescribing these medications, this is the information you should be aware of. There are three major systems NSAIDs can act on and cause potentially lethal side effects. These are the cardiac, gastrointestinal (stomach) and renal (kidney) systems.

In terms of the cardiac dangers, it appears that pretty much all NSAIDs except for aspirin (which protects the heart) can cause complications (naprosyn has fair evidence that it may be relatively safe as well). The major concern is that these medications may cause stroke or heart attack. This is particularly scary when one considers that by virtue of just being an American, you have an approximately one in three chance of dying from one of these conditions anyway. It seems silly to increase your odds any more. The best studies to date have been fairly inconclusive about what the exact risk is, but it seems apparent there probably is a real relationship. One study — looking at Celebrex specifically — showed patients taking Celebrex had a 2.3-percent chance of dying from stroke or heart attack over a three-year period versus the placebo group, which had a 1-percent chance of dying from stroke or heart attack over the same time period. This might seem like a small increase, but it is the same as “doubling your risk.” It is difficult to single out Celebrex, because other NSAIDs may carry similar risk.

Additionally, being on NSAIDs for a long period of time can raise blood pressure an average of five points. This can increase cardiovascular problems in and of itself, and it can have very profound effects — especially in people with high blood pressure to begin with or in patients with conditions like diabetes. Another effect of NSAIDs is

Figure 3

Cyclo-oxygenase (COX) Isozyme Selectivity of Select NSAIDs, as Assessed by Whole-Blood Assays

Compound	Common Trade Name(s)*	COX-1/COX-2 IC ₅₀ ratio ^b 1
TRADITIONAL NSAIDs^c		
Fenoprofen	Nalfon™	
Ibuprofen	Advil™, Motrin™	
Indometacin	Indochron™, Indocin™	
Ketoprofen	Orudis™, Oruvail™	
Ketorolac	Toradol™	
Naproxen	Aleve™, Naprosyn™	
Paracetamol (acetaminophen)	Datril™, Panadol™, Tylenol™	
Piroxicam	Feldene™	
COXIBs^d		
Etodolac	Lodine™	5
Meloxicam	Melflam™, Mobic™, Movalis™	6
Diclofenac	Cataflam™, Voltaren™	12
Celecoxib	Celebrex™	17
NS-398	Experimental agent	22
Nimesulide	Aulin™, Mesulid™, Nimed™	23
Valdecoxib	Bextra™	44
Parecoxibe	Dynastat™	
Rofecoxib	Vioxx™	137
Etoricoxib	Arcoxia™	225

Figure 4

Patient Age	Serious bleed	Death
16-44	5/10,000	1/10,000
45-64	15/10,000	2/10,000
64-75	17/10,000	3/10,000
Over 75	91/10,000	15/10,000

that they can cause salt retention, and this may further raise blood pressure in susceptible individuals. This can be especially dangerous in patients with congestive heart failure. It is the author's opinion that anyone with a diagnosis of congestive heart failure or suspected congestive heart failure should be *very* cautious about the use of NSAIDs.

In terms of the gastrointestinal side effects, these seem to be as alarming as the cardiac side effects. The major concern here is that these medications can slowly erode away the lining of the stomach and cause a condition called gastritis. In people with peptic ulcer disease, NSAIDs can also make the ulcers worse. Both of these conditions can eventually lead to internal bleeding, and many people die from this each year in our country. Many others are hospitalized, and this is responsible for a large cost to our health care system. One particularly susceptible population is those people older than 75. The best available data shows 15 out of 10,000 people older than 75 on long-term NSAID use will die from a GI bleed. An additional 91 out of 10,000 will be hospitalized (see figure 4). These numbers are surprisingly high, especially when one considers only one in 10,000 women will die from ovarian cancer, and only approximately 20 out of 10,000 men ages 70 to 79 will die from prostate cancer.

Celebrex has been advertised as significantly decreasing the risk of both stomach discomfort and internal bleeding, but this benefit is negated if someone is taking aspirin along with it (which many people do to protect their hearts). Additionally, if someone uses Celebrex for longer than six months, it appears their risk of developing a bleeding ulcer is the same as someone taking one of the other NSAIDs. Fortunately, the gastrointestinal risks of these drugs can be offset by taking other medications, such as Prilosec, Pepcid, or Zantac (specific dosing and regimen should be given by a physician).

Lastly, most NSAIDs affect the kidneys and have the potential of causing them. In healthy individuals, this does not seem to be a major issue, but it can become one if people are taking high-dose NSAIDs for an extended period of time. Furthermore, people with pre-existing kidney problems or who take other medications that can affect kidney function (such as ACE inhibitors or diuretics for blood pressure) should be cautious about the use of NSAIDs.

Conclusion

In summary, the paragraphs highlighting the negative aspects of NSAIDs seem to be longer than the ones highlighting the positive aspects! Despite this, there are some very good indications for using NSAID medications, but patients should talk with their physicians about all their treatment options to make sure that they are truly indicated. They should also be aware of potential side effects and carefully weigh the relative risks and benefits. And remember, at the CORE Institute, our job is to "Keep Life in Motion...."




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Functional Management of Lateral

Acute lateral ankle sprains have been shown to account for a substantial percentage of clinical physician referrals and emergency room visits annually, averaging by some estimates one injury per 10,000 individuals in the United States alone.



by Mark Jagodzinski, PT, DPT

For the weekend warrior, this means time away from chosen recreational endeavors and possibly time away from work, depending on severity of the injury. For the competitive athlete, this means time away from sport, and due to the complexities of effective diagnosis and rehabilitation, potentially lost time to compete at an elite level due to the chronic nature of this injury once an acute episode has occurred. The

good news is that research favors early functional management for all but the most severe injuries. Furthermore, research demonstrates that well-designed rehabilitation programs can help by decreasing leave of absence from work for the weekend warrior, and can facilitate an earlier return to sports for the elite athlete, doing so for both generally without the risk of less-than-spectacular functional results in the long run.

In spite of the astronomical figures relating to acute lateral ankle injuries, a deficit of specific evidence-based treatment regimens exists. To examine these topics, we must first look at how the injury occurs. The vast majority of these injuries occur in athletes younger than 35, but most first episodes commonly occur in athletes between the ages of 15 and 19. The mechanism of injury usually involves landing on another object (typically someone else's foot) and rolling the ankle outward, resulting in stretching or tearing of usually two of three major ligaments (connect bone to bone) in the outer portion of one's ankle. Injuries can also be seen with sudden change of direction or with variances in the playing surface. Individuals with high arches are at a more-distinct disadvantage when coupled with the demands of sports-oriented activities.

Once the injury occurs, evaluation and diagnosis can be made by any combination of sports medicine physicians, physical therapists and athletic trainers, who often work together to provide the best care possible. The injury is then diagnosed by grade of severity to

facilitate selection of the most appropriate course of treatment. Traditionally, these injuries fall into grades I, II or III, depending on the amount of connective tissue injury, soft-tissue injury, bleeding and degree of associated functional impairment. X-rays frequently are utilized to rule out the presence of any fracture(s), in addition to clinical evaluation. Recent trends point towards avoidance of evaluation of the affected body part in isolation and instead emphasize evaluation of the affected body part as a component of an entire kinetic chain to highlight strength, flexibility and proprioceptive (joint sense) imbalances that may have been contributing factors. This is essential to diagnosing the difference between chronic ankle instability (CAI) and functional ankle instability (FAI). CAI is characterized by pathologic structural weakness in the joint structures, whereas FAI is most characterized by lack of neuromuscular control within a normal range of motion. Once these impairments have been properly diagnosed and classified, it is universally accepted that grades I and II can be most effectively managed functionally. At this point, much dispute remains about the classification and treatment of grade III sprains, which have typically resulted in surgical scenarios but are now being considered on a case-by-case basis for nonoperative functional management.



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Ankle Sprains

Once an acute lateral ankle injury has been properly diagnosed and graded, treatment can begin. Early rehabilitation is the mainstay of management, and the ultimate goal is return to function as soon as possible. To achieve this, the injured area goes through three phases; inflammatory (two to four days), repair and regeneration (one to four weeks) and, finally, remodeling and maturation (four to six weeks-plus) of the involved tissues. The goals here are to encourage return to function within the limits of the healing tissue and avoid the extremes of immobilization and unrestricted activity. The time-tested RICE method (Rest, Ice, Compression, Elevation) helps to decrease pain and inflammation acutely in the first 24 to 48 hours. Once this has been achieved, the overall goals are to restore normal range of motion, restore normal strength throughout the kinetic chain, and facilitate improved neuromuscular control by enhancing proprioception with re-introduction of sport-specific movement patterns. Clearly, modalities such as icepacks, ultrasound, electrical stimulation, iontophoresis and others, as well as gait aids like crutches, are helpful in facilitating the constructive rest necessary to facilitate the healing process. Additionally, foot orthoses, bracing and taping have been shown in many cases to be helpful, but data regarding these topics is mixed at best.

Most recent research clearly defines the role of balance training and kinetic-chain strengthening as a means of improving return of functional joint stability and increasing postural control. Joints of the lower extremity cannot work in isolation from one another, and if you will recall a song from childhood, it was playfully noted that the hip bone was connected to the knee bone and so on. We now call that the “kinetic chain,” and as such, it denotes the importance of strengthening ankle muscles — particularly the lateral ones — to function synergistically with knee/hip musculature to facilitate maximal control from the top of the chain down and from the bottom of the chain up. Following an acute lateral ankle injury, the static stability normally provided by ligaments has been compromised. By contrast, properly trained muscles emphasizing co-contraction have the effect of increasing dynamic stability and compensating for the existing weakness in the ligaments. Most athletic movements require eccentric muscle control to smoothly dissipate forces placed on the body with deceleration and change of direction. Eccentric muscle function is best described as contraction of the muscle as it lengthens, and many would argue that recovery of maximal strength hinges on the ability to incorporate this into any rehabilitation program. Criteria for a return to sport should focus on the recovery of pain-free active range of motion, normalized strength throughout the entire lower extremity and absence of pain/swelling with sport-specific functional movement. A return to sport will usually occur concurrently with some form of prophylaxis, such as taping or bracing.

Truthfully, the best treatment is prevention, but how to approach this remains the question at hand. If you are an athlete, regardless of age or ability, and you recently have suffered an ankle sprain for the first time or continue to suffer from repetition of older injuries, evaluation and treatment by well-trained sports medicine professionals can help you return to participation.



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by Susan Welter, RD, CDE

Supplements for Sports Performance – *Help or Hype?*

The supplement industry is a multi-billion-dollar industry and keeps growing every year. Athletes, as well as general sports enthusiasts, spend millions on dietary aids hoping to either improve performance or health.

The legal definition of a dietary supplement is: "...a vitamin, mineral, herb, botanical, amino acid, metabolite, constituent, extract or a combination of any of these ingredients." In the United States, dietary supplements are regulated by the FDA under the 1994 Dietary Supplement Health and Education Act (DSHEA), which establishes legal definitions and label guidelines. What the act does not do is ensure safety, effectiveness or quality of dietary supplements. Herein lies the problem. Consumers assume when they go into the local health food store and purchase a product, it contains exactly what is listed on the label and does what the label advertises it will do.

Some of the top-selling supplements purchased by those interested in enhancing sports performance include: creatine, conjugated linoleic acid (CLA), guarana and caffeine, glutamine and beta-hydroxy-beta-methylbutyrate (HMB).

Creatine is a nitrogen-containing compound found in small amounts in meat and fish. It is used in the body as a source of muscle energy in the form of phosphocreatine. Sales of creatine have been on a huge incline since the mid-1990s for its alleged muscle-building effects. It is one of the most highly researched sports-related supplements. Creatine increases water retention in muscle cells and also seems to stimulate energy storage in muscle. Although research supports its ability to improve muscle strength, it does not appear to have any influence on enhancing performance in endurance sports. Creatine is sold as creatine monohydrate in the form of pills, powders and beverages. The usual dose is three to five grams per day, although some athletes use three to four times that amount. Creatine seems to be safe for adults, but it has not been studied in adolescent athletes, so is not recommended for those younger than 18.

Who would think that ingesting a particle found in fat could lead to the loss of weight and fat and to muscle gain? That is exactly what marketers of conjugated linoleic acid (CLA) claim. CLA is a class of fatty acids produced naturally and found in low concentrations in human blood and tissues. We consume CLA when we eat lamb, beef and dairy products. Cooking meat increases the CLA content.

Although some studies in animals have found favorable results in reducing body fat and increasing lean body mass, human studies have not shown the same favorable effects. In fact, in one well-designed study, CLA increased fasting blood glucose and insulin resistance in individuals with diabetes.

CLA is produced synthetically from sunflower oil and sold in capsules that are 60 to 80 percent CLA. Manufacturers usually recommend one to four grams per day. The most common side effect is gastrointestinal upset (diarrhea, nausea, loose stools), and the safety of long-term supplement use is unknown.

Guarana, extracted from seeds of creeping shrubs grown primarily in a small area of Brazil, is named after the Guarani Amazonian tribe that used the seeds to brew tea. They also added crushed seeds to food and beverages to increase alertness and fight off fatigue.

Marketing claims for guarana include: aids in weight loss, suppresses appetite, improves athletic performance and prevents fatigue. Limited evidence suggests guarana may have a limited effect as a short-term weight-loss aid. No studies have been conducted on long-term use. There is no evidence showing guarana specifically suppresses appetite, increases athletic performance, or prevents fatigue. Caffeine itself does have some performance-enhancement effects due to its stimulating effect on the central nervous system.

Guarana seeds contain 4 to 5 percent caffeine — compared to coffee beans, which contain 1 to 2 percent. Guarana supplements typically contain as much caffeine as one to two cups of coffee. Many energy drinks and bars contain guarana, as do a variety of weight-loss products. Guarana is available in capsule and tablet form. The tablets contain 500 to 1,000 milligrams of the supplement. Side effects include insomnia, heart palpitations, tremor, nausea, diarrhea and severe dehydration. Reports of caffeine intoxication — some of which led to death — have occurred when large doses of guarana supplements were added to energy drinks or coffee. The majority of these occurred in young adults. No more than 3,000 mg per day should be taken due to serious effects at a larger dose.

Anyone with a heart condition, high blood pressure, bleeding condition, glaucoma or anxiety disorder should not take guarana. Persons taking any medication (either prescribed or over the counter) should consult with a physician before beginning a regimen of guarana.

For endurance athletes, it is not uncommon to get hit with a cold or other infection during the height of training right before an event. The stress of endurance exercise on the body leads to depressed immunity. Glutamine is part of the body's protein mix, which is considered a nonessential amino acid under normal conditions. But the demands for muscle glutamine exceed the supply during stress. Because plasma glutamine in endurance athletes can be decreased after strenuous exercise, it is considered a conditional essential amino acid.

Supplementation with glutamine is purported to improve immune response during exercise, thus leading to a lower rate of infections and an improved recovery time. In weight training, marketers claim it improves recovery, reduces muscle catabolism (breakdown), and enhances muscle gain. There is no evidence to the claim for weight training improvements, and there is limited research with mixed results to support the claims for its use in endurance sports.

Glutamine is found in protein-rich foods and synthesized in the body from glutamic acid. At the health-food store, you will find it available in capsules, pills, and sports beverages in the form of L-glutamine. It is also a component in protein powder supplements. Products contain 0.5 grams to 20 grams per serving. Manufacturers recommend anywhere from five grams to more than 20 grams per day. No studies have shown any negative effects of glutamine supplementation.

A cheaper and possibly more effective strategy to maintain plasma glutamine levels may be to consume carbohydrates between repeated exercise sessions. Carbohydrates not only preserve glutamine levels, but they also enhance exercise performance by replenishing muscle energy stores.

Many people who strength train are looking for an edge. A more recent supplement added to the market, HMB, has been promoted to enhance lean body mass and increase muscle-strength gains. HMB is a metabolite of leucine, a branched chain amino acid. We produce 0.2 to 0.4 grams of HMB per day in the liver and muscle, depending on our protein intake. Studies showing that HMB increases lean tissue mass and enhances immune system in farm animals have led to supplementation in animal feed.

Preliminary evidence from some studies suggest three grams of HMB per day may increase strength and lean body mass in adults who exercise, including elderly exercisers. There appears to be a greater benefit in untrained exercisers. There are no long-term studies on the supplement, but it does seem to be safe.

HMB is sold as calcium-HMB in tablets, capsules and some nutrition bars with suggested dosages ranging from one to three grams per day. Each tablet contains 0.3 to 0.5 grams, so a person would need six to nine tablets per day to reach the recommended dose. HMB is also often sold in products containing other sports-enhancing ingredients.

Here is the bottom line on the four supplements reviewed. Do not spend your money on CLA or guarana. For strength training, or if you are performing stop-and-go sports (football, soccer, basketball, volleyball, etc.), creatine supplementation may benefit you. If you are fairly new to exercise, you may receive some benefit from HMB. Glutamine may be effective for some athletes, so if you are an endurance athlete and are prone to infections, it may be worth a try. Always check with your physician before deciding to supplement your diet, due to possible interactions with other medications you may be taking.

Two critical questions that health-conscious consumers need to ask before purchasing a supplement are: (1) "Is it safe?" and (2) "Is it effective?" All too often, consumers will not get clear-cut "yes" or "no" answers. But by doing a little homework, your chances of not getting duped are better.

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by John Thompson, DO

Joint Arthroplasty in the Athlete

An increasing number of adults participate in sports and wish to remain active as they age. Although most injuries are acute or overuse injuries that result in diminished flexibility and endurance, some can lead to a more chronic deterioration of the joints. When this occurs, athletes seek the advice of orthopedic surgeons to discuss their treatment options. After all nonoperative treatments have been exhausted, joint arthroplasty may be indicated. While in the past, joint replacement surgery was reserved for those older than 50, with the quality and variety of prostheses available, surgeons today have been pushing the envelope by performing these procedures on younger, more active adults. With increasing news coverage on such athletes as Bo Jackson, Jack Nicklaus and Floyd Landis, joint arthroplasty in the athlete has become a more acceptable trend.

Minimally Invasive Surgery

While the implant companies strive to create the greatest design and materials for joint arthroplasty, surgeons are working on the most effective and efficient approaches to the joints. Minimally invasive surgery has been the push during the past five years. The theory is less tissue damage during the surgery may lead to decreased post-operative pain, blood loss and recovery time. Tissue-sparing techniques can provide improvement in the immediate post-operative phases of recovery.

Computer-Assisted Surgery

Computer-assisted surgery has evolved during the past few years. With the assistance of the computer, bony and soft-tissue alignment can be assessed in great detail. Throughout the surgery, corrections can be made to change the mal-alignment to mimic the more normal positions. Realigning the mechanical axis of the joint and re-establishing the normal leg length helps restore the normal forces of the joint. This ultimately leads to maximizing the functionality and longevity of the joint replacement.



The Knee

The knee is an extremely dynamic joint. It function primarily as a hinge joint with rotational properties. A change in the articulating surface can lead to symptoms such as locking, popping or clicking. The pain can be sharp, a dull ache or a combination of the two. It may lead to decreased motion in both flexion and extension and most commonly leads to a varus (bowlegged) deformity. These alterations in body mechanics can severely limit the functional capabilities of the joint, particularly with deep bending or twisting motions, which are required in many of the sports we participate in. The primary goal of all knee surgeries is to attempt to reestablish the dynamics of the joint while altering the lining of the joint to decrease the pain.

Osteotomy

For athletes participating in contact and high-impact sports, an osteotomy is the gold stan-

dard. An osteotomy involves taking a wedge of bone out of the distal femur or proximal tibia. This alters the mechanical axis of the joint, thereby transferring the majority of the forces to the “good” side of the joint. The advantage to the procedure is there are no alterations to the ligaments, meniscuses or articular cartilage. The disadvantage is that pain will still exist — just not to the extent it was before. These are very successful procedures in meeting the objective of returning a young athlete to sport. Outcomes have shown the majority of patients can average five to 10 years of an active lifestyle prior to conversion to a total-joint replacement.

Partial-Knee Replacement

A unicompartmental joint replacement has been advocated in the younger, more active patient. This most commonly involves the medial compartment of the knee but can also be performed on the lateral and patello-femoral joint. This involves resurfacing

both sides of the compartment of the joint and placing a polyethylene insert in between the two metal-alloy surfaces. The surgical approach is less invasive than for the total-knee replacement and preserves the ligamentous structures. This allows for a faster recovery and return to near normal joint mechanics. Significant trials have not been performed in high-impact athletes. Concerns exist about loosening, excessive wear and periprosthetic fracture. A newer device offers a mobile bearing component. With this device, the polyethylene liner is not locked into the tibial component, thereby allowing it to rotate. By allowing unconstrained axial rotation, it can provide greater articular conformity throughout the range of motion without an increased probability of loosening due to increase axial torque. The disadvantages include bearing breakage, soft-tissue impingement or dislocation. Despite these well-thought-out designs, long-term results have not shown superiority to the well-designed fixed-bearing surfaces.

Total-Knee Replacement

A total-knee replacement requires resurfacing of all three compartments of the knee. The articulating surface then becomes metal-on-plastic as opposed to bone-on-bone. The benefit is this does not hurt. The disadvantages is that one or two of the main ligaments of the knee are sacrificed to gain access to the knee joint and help balance the soft tissues. This may lead to increased anterior translation of the tibia in relation to the femur. This makes sports involving pivoting and acceleration/deceleration maneuvers (i.e., basketball and tennis) difficult. Additionally, small nerves within the joint called proprioceptors are damaged from the surgical approach and/or are surgically removed or covered with the resurfacing of the ends of the bones. These proprioceptors send impulses from our joints to the brain and back again. This informs the mind where the body is in space and time, allowing it to maintain balance, change direction, and adjust speed. With the degenerative changes of the joint, these also can be damaged — just not to the extent of the joint replacement. This is one of the reasons an osteotomy remains the gold standard in the high-impact athlete. Total-knee replacement is, therefore, reserved for lower-impact sports, such as golfing, biking, swimming, dancing and pickleball. With the change in the mechanical alignment and reduction in pain, these sports become much more enjoyable. Gray zones for sports are softball and jogging. The forces across the joint with running or

jogging can exceed seven times a person's body weight. These forces on the replacement joint during long periods of time have not been analyzed extensively in the lab. Early failure of the implant-bone interface, implant-implant interface or of the components themselves would not be unreasonable. It is, therefore, not recommended.

Press-fit components have a beaded or coated surface, allowing bone ingrowth. This technology is often reserved for the younger and healthier individual. If bony ingrowth is successful, disassociation of the prosthesis from the bone would be highly unlikely. Titanium implants offer the most superior strength of all implant material while most closely mimicking the modulus of elasticity of bone. Highly cross-linked polyethylene has been proven in laboratory tests to be far superior to polyethylene of just one decade ago. This allows greater longevity of the joint by decreasing polyethylene debris that leads to osteolysis and, ultimately, joint-replacement failure. The new technologies in total-knee replacement have been more geared toward decreased polyethylene wear rates as opposed to durability with high-impact activity. However, with the active baby-boomer population, companies will need to consider this in their product development.

Hip Arthritis

Surgical treatment for hip arthritis has changed dramatically during the past decade. An array of options exists for surgical approaches, product design and contact surfaces. The surgical approach is based on surgeon familiarity, ease of access, prior surgeries, pre-existing neuromuscular disorders, maintaining joint stability and muscular integrity. All surgical approaches have their advantages and disadvantages. The approach that allows the best access, visualization and reproducible results with positioning of the components is the most important for the surgeon. Theoretically, minimally invasive techniques offer less surgical-site morbidity and improved cosmesis. My preferred technique is the minimally invasive computer-assisted posterior approach through an incision three to four inches long. This is a reproducible approach that allows good visualization and precise positioning of the artificial joint. It is ideal for the active adult.

New Technology: BHR

The standard total-hip replacement has a wonderful track record — roughly 95 percent good to excellent long-term results. This is

considered the standard of care for the surgical treatment of hip arthritis. Hip resurfacing has now been reintroduced to the United States. The Birmingham Hip Resurfacing system (BHR) has had a tremendous track record in Europe. It has now been approved for use in the United States. This is a metal-on-metal interface that mimics the normal size of the hip surfaces, thus allowing for similar characteristics of motion and stability. Its goal is to allow for a return to the normal level of activities. The disadvantages of the procedure include the fact that it is a more extensive surgical approach, and it does not protect patients from femoral neck fractures that are more prevalent as they get older. For athletes who wish to participate in activities involving running and jogging, this is an excellent choice — if they are willing to except the potential risks associated with it.

Alternative bearing surfaces and size modifications have potentially significant affects of the life and stability of a hip replacement. The standard by which all are measured is metal-on-polyethylene. Highly cross-linked polyethylene debatably has been the most significant discovery during the past decade. The improved wear characteristics obviously lead to increased longevity of the components, but they also give us one more advantage. They allow for the femoral head size to be larger. This translates into improved range of motion and stability. Therefore, such sports that demand increased motion, such as bowling, skating and curling, would allow the athlete improved flexibility with less chance of dislocation. Metal-on-metal, ceramic-on-ceramic, metal-on-polyethylene and ceramic-on-polyethylene are all options available to patients today. (Current research is being performed on diamond-coated articulating surfaces.) Each comes with its own risks and benefits. This is something each patient must discuss with his or her own surgeon prior to surgery. The components are not engineered to survive a set number of years. Their longevity is solely dependent on the number of cycles in which they are used, thus making this a significant decision for the endurance athlete.

Conclusion

Joint arthroplasty has crossed over to the athlete. While the indications for surgery have not changed, the availability of the latest techniques and technologies has allowed us to push these prostheses to higher demands than once expected. While many aging athletes have musculoskeletal problems that mandate tailoring their activity, it does not mean they need to stop.

道 zen wellness

Throughout the ages, people have sought ways to enhance their lifestyle and quality of life. Traditional medicine has proven effective in many cases, but for most, lifestyle changes, such as adopting healthy eating habits and exercising daily, lead to increased success in achieving well-being. The latest trend in wellness, balance and longevity is a physician-recommended program called Zen Wellness. This alternative fitness course provides a new approach to comprehensive well care.



Zen Wellness is based on three complementary philosophies that relate to health, healing and longevity. It focuses on what is put into the body, what is put into the mind, and how people move their bodies. With nutrition recommendations, continuing education classes and fitness classes, Zen Wellness provides a comprehensive approach to achieving total wellness. Oftentimes, these fitness programs can restore quality of life for individuals who have been diagnosed with health conditions such as osteoporosis, arthritis and back and neck pain. For example, the Tai Chi discipline is recommended for osteoporosis to increase strength, mobility and health because of its focused, graceful movements. The long-term benefits enhance lifestyle and open doors to a quality-of-life change.

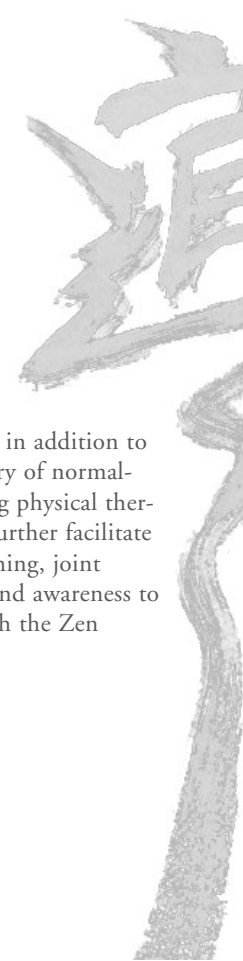
Patients with arthritis most commonly agree that they experience far worse joint symptoms during severe weather conditions. Cold weather tends to stiffen joints, whereas warm weather can ease arthritic inflammation. There are many different conditions the weather can have an effect on, from arthritis to asthma. As an integral part of the five elements — wood, fire, earth, metal and water — the weather can certainly impact individuals and health conditions. Tai Chi and Chi Gong are fitness programs that integrate five element movements into participants' routines to provide participants with a better understanding of how natural changes within the body and outside environment affect one's overall well-being. Chi Gong can then help to improve balance, agility, strength, flexibility, stamina, muscle tone and coordination.



Restoration of flexibility and resting muscle length, in addition to joint mobility, is also essential to facilitating recovery of normalized movement patterns. For individuals undergoing physical therapy, Zen Wellness programs can complement and further facilitate quality of life. Physical therapists may utilize stretching, joint mobilization and postural/positional re-education and awareness to achieve this. These procedures go hand in hand with the Zen Wellness Center's holistic approach to exercise.

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Please consult your physician before beginning this or any other exercise program.





Kyle Brooks, PA-C



Dan Neal, MS, PT

Is

Viscosupplementation Right for Me?

by Kyle Brooks, PA-C, and Dan Neal, MS, PT



- Do you have knee pain and stiffness?
- Have you been diagnosed with osteoarthritis?
- Is your knee pain keeping you from the active lifestyle you desire?

If you answered “Yes” to any of these questions, viscosupplementation may be the solution to your knee pain.

One in every three people older than age 63 suffers from significant osteoarthritis of the knee. Symptoms associated with arthritis include muscle weakness, decreased flexibility, significant joint pain and, in many cases, depression. Knee pain due to osteoarthritis can dramatically affect sufferers’ activity levels, keeping them from the sports and hobbies they enjoy most.

What causes arthritis? Arthritis is a detailed process. However, the short answer involves a breakdown in the structure of the cartilage in the knee joint — which, over time, leads to degradation of the joint surfaces. It is also important to note that people who suffer from osteoarthritis have lower-than-normal levels of hyaluronic acid in their joints. Hyaluronic acid is a naturally occurring substance found in synovial (joint) fluid that functions to lubricate the joint. This lubrication process decreases frictional forces and provides a cushioning effect that is particularly important with movement and activities. Without adequate levels of hyaluronic acid, synovial fluid is unable to perform its necessary function optimally. Decreased levels of hyaluronic acid and

improperly functioning synovial fluid leads to ongoing cartilage breakdown, thus worsening osteoarthritis of the knee.

Viscosupplementation is a procedure in which synthetically derived hyaluronic acid is injected into the knee joint. Viscosupplementation aims to stop — or, at least, slow down — this process and, thus, minimize the knee pain associated with osteoarthritis. These injections of hyaluronic acid enhance synovial fluid and improve the lubrication within the knee joint. Better-functioning joint fluid and decreased cartilage breakdown often result in decreased knee pain and improved range of motion. Thanks to viscosupplementation injections, numerous individuals are able to return to their desired athletic lifestyles and activities despite their knee osteoarthritis.

Physical therapy is another excellent conservative treatment modality to combat knee osteoarthritis. Overcoming strength deficits and range-of-motion limitations is crucial to healthy, functioning knees. Physical therapy helps instruct patients how to properly exercise their arthritic knees enabling them to increase their overall activity levels.

Most patients undergoing viscosupplementation injections report the greatest pain relief around eight to 12 weeks after the injections. Combined with the benefits of consistent exercise, many patients continue to experience pain relief for six months and beyond.



by Jonathan Mack, MD

TELL ME MORE ABOUT... MENISCAL TEARS

Tearing of the meniscus is one of the most common injuries occurring in the knee. The meniscus is a rubbery, wedge-shaped tissue in the knee sandwiched between the ends of the femur and tibia. It functions as a shock absorber in the knee, reducing the force transmitted to the cartilage on the ends of the femur and tibia by 50 to 70 percent. There is a meniscus on both the inside (medial) and outside (lateral) portion of the knee, and the tissues are roughly shaped like the letter “C.”

Tearing of the meniscus can occur under both traumatic and nontraumatic conditions. Most traumatic injuries involve a sudden twisting or pivoting motion while engaged in a sports activity. Nontraumatic tears often result from progressive weakening and thinning of the meniscus over time and are, therefore, more frequent in older patients.

Symptoms of a meniscus tear usually include knee pain and swelling. With large tears of the meniscus, sensations of the knee locking, clicking or catching may be present. The diagnosis of a meniscus tear is primarily based on a patient’s history and physical exam findings. While there are multiple special physical examination tests to help diagnose a meniscus tear, the most significant finding is tenderness along the joint line (where the femur and tibia meet). X-rays of the knee are frequently obtained to evaluate for other causes of knee pain, such as arthritis (cartilage wear). MRI testing of the knee helps improve the diagnostic accuracy of meniscal tears, with detection rates of 80 to 90 percent.

The initial treatment of a meniscus tear involves ice, elevation and rest of the affected knee. The decision to perform surgery for a meniscus tear is based on a patient’s symptoms and his or her ability to perform daily activities. If a patient does not have significant problems with either of these conditions, surgery can often be delayed or avoided altogether.

In general, there are two surgical treatment options for a meniscus tear. One treatment involves repairing the torn portion of meniscus, and the other involves removing the torn portion of meniscus (called a meniscectomy). When successful, repair of a torn meniscus can restore the normal anatomy of the knee and it has a better long-term prognosis than a meniscectomy procedure. One drawback of a meniscus repair is a lengthy recovery time (four to six months before returning to unrestricted activities). Additionally, a tear must meet specific criteria that determine its ability to heal. One of the most crucial requirements is that the tear be located in the peripheral one-third of the meniscus. Only this area of the meniscus has a blood supply, and without this blood supply, attempts at repair are very likely to fail. Most nontraumatic tears involve regions beyond the peripheral one-third of the meniscus, and therefore, they are not able to undergo repair.

When repair is not possible, a meniscectomy is performed to manage the torn meniscus. This procedure is done with much greater frequency than a

meniscal repair. Meniscectomy has a relatively fast recovery time, with a return to unrestricted activities allowed after four to eight weeks. The main drawback for a meniscectomy is the potential for future knee arthritis secondary to the absence of a normal meniscus. The time frame for the development of arthritis is approximately 10 to 15 years, and it is highly dependent on the amount of meniscus that needs to be removed at the time of surgery.

A possible future treatment for meniscus tears involves the use of artificial meniscus scaffolds. These scaffolds are designed to help recreate the shape of a normal meniscus tissue. Preliminary studies have been performed with patients who underwent a meniscectomy and replacement of the resected meniscus using the scaffold. At the three-year follow-up, patients reported a decrease in symptoms and no adverse reactions to the scaffold material. Additional testing is still being conducted to determine the long-term safety and outcomes of artificial meniscus scaffolds, as well as their application to large meniscal tears. It is hoped continued research in this area will improve the treatment of meniscal tears.



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