



30th Anniversary

HUGHSTON HEALTH ALERT

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Hip Arthroscopy

Hip arthroscopy has gained in popularity over the past 20 years due to the minimally invasive nature of the surgery and the ability to address different types of disease or injury. Surgeons primarily use arthroscopic surgery (tiny camera and instruments inserted into the joint) to remove loose bodies, which are small pieces of cartilage (tissue that covers the ends of bones) that have broken off and then move around inside the hip joint. Surgeons also use this surgery to treat labral tears, injuries to the cartilage of both the femoral head (ball) and acetabulum (socket), and femoroacetabular impingement (**Fig.1**).

The hip joint is a ball-and-socket joint that connects the femur to the pelvis (**Fig. 2**). There are different elements in and around the hip joint that can be a source of pain, such as damaged cartilage and ligament (tissue connecting 2 bones) tears. When the physician evaluates a patient, it is critical to determine whether symptoms are intra-articular (coming from within the joint itself), or extra-articular (around the joint). For conditions that arise within the joint, hip arthroscopy can be a possible solution to address these problems.

Diagnosing hip pain

Your physician will complete a thorough physical exam, record your health history, and order x-rays to

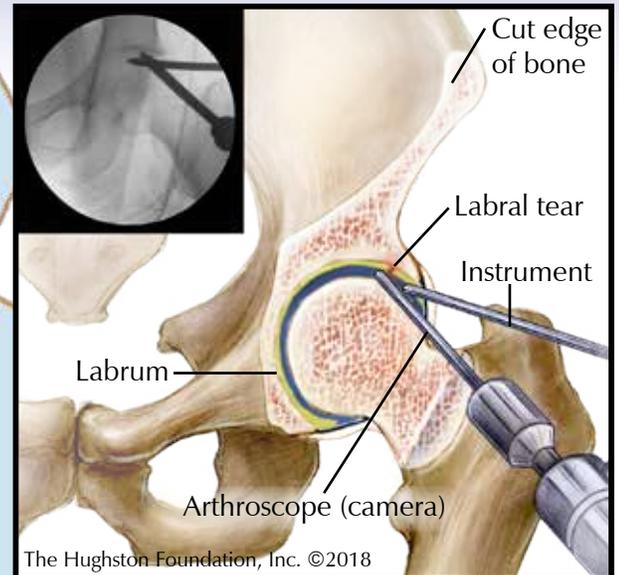


Fig. 1. Arthroscopic procedure of labral tear (inset - fluoroscopy image taken during surgery)

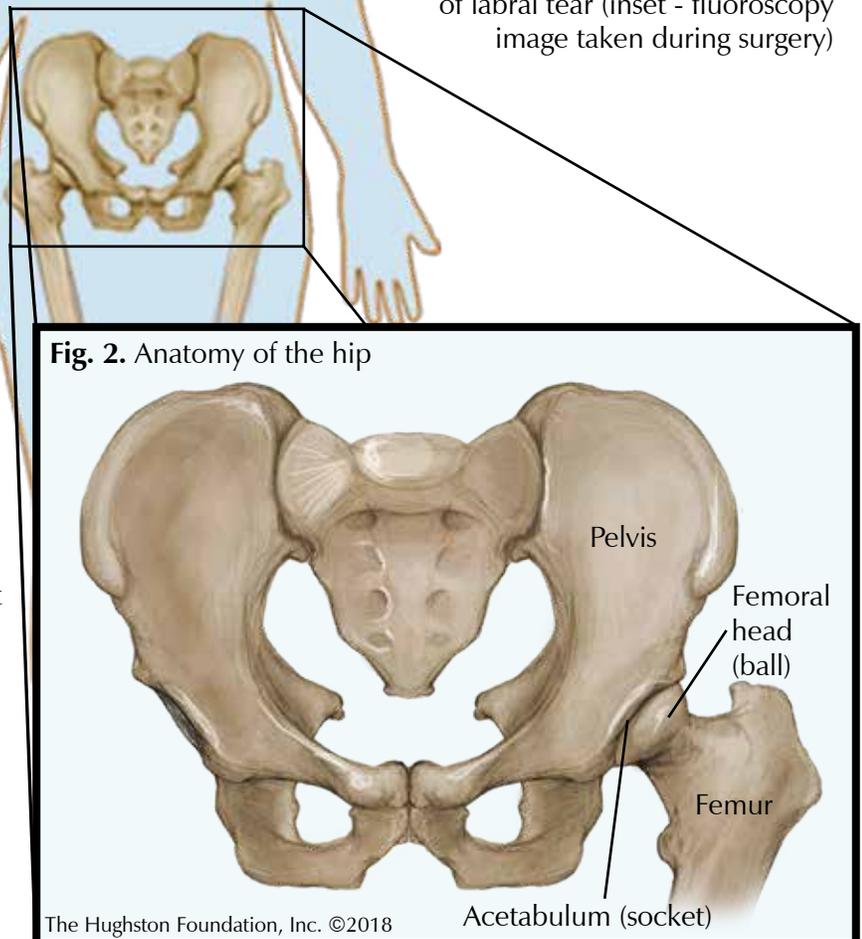


Fig. 2. Anatomy of the hip

determine the cause of your hip pain. X-rays are a good tool for evaluating the bony structures around the hip joint. Most patients with suspected intra-articular disease who do not have obvious arthritis on x-rays will also undergo a magnetic resonance imaging (MRI) scan. A MRI is especially useful to evaluate the soft tissue structures around the hip, such as the cartilage, labrum, and tendons, which may be injured.

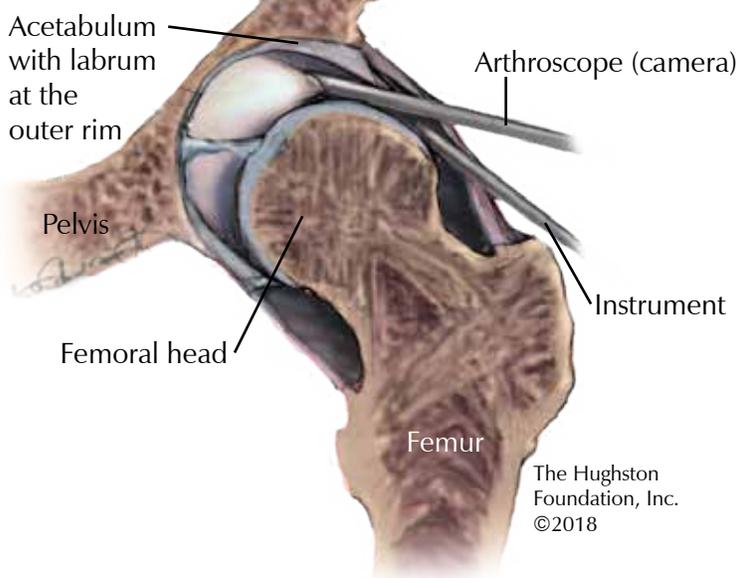
Nonsurgical treatment

If you have no mechanical symptoms, such as catching, popping, or a clicking sensation in your hip, your physician often begins with nonsurgical treatment. Nonoperative treatments can include resting the joint if you are involved in regular exercise or athletic activity, anti-inflammatory medications, physical therapy, and steroid injections. If these treatments fail to alleviate your pain and you continue to have difficulty either walking or standing, your physician may recommend hip arthroscopy.

Arthroscopic treatment

Your physician will discuss arthroscopic surgery with you if nonsurgical treatments have failed and your symptoms disrupt your normal day-to-day activities. Surgeons perform hip arthroscopy under general anesthesia and routinely use a special table to allow distraction (a gentle separation) of the ball from the socket to access to the intra-articular structures. Two common hip injuries treated arthroscopically are femoroacetabular impingement and labral tears (**Fig. 3**).

Fig. 3. Arthroscopic procedure of a dislocated hip (cross-section)



Femoroacetabular impingement

Femoroacetabular impingement (FAI) is a disorder of the hip in which the femoral head and neck rubs or “impinges” on the acetabulum. There are 2 types of FAI: cam impingement refers to a femoral-based disorder and is often seen in young athletic males and pincer impingement refers

to an acetabular or socket-based disorder usually seen in active, middle-aged women. For both of these impingements, pain results from the proximal, or top of the femur abutting the acetabulum during range of motion, especially while bending. Patients often present with symptoms that include activity-related groin pain, difficulty sitting, and mechanical symptoms that includes a catching, clicking, or popping sensation during movement. If your physician suspects FAI, he or she will order x-rays to determine the shape and contour of the femoral head and neck as well as look for any abnormalities of the acetabulum. Your physician will also order a MRI to evaluate further the soft tissue structures in and around the hip.

At the time of arthroscopic surgery, the surgeon introduces the arthroscope into the hip joint to perform an initial diagnostic examination. Once inside the joint, the surgeon will look for disease or damage, such as cartilage defects of the femoral head and socket, loose bodies, and tears of the labrum.

Labral tears

The labrum is a horseshoe shaped structure that lines the outer rim of the hip socket. It is made of fibrocartilage and dense connective tissue. Sometimes when femoroacetabular impingement occurs, the labrum is torn. This tear can lead to pain during movement and you may experience catching, snapping, or locking. You may also feel a vague pain in your groin. If your doctor suspects a labral tear, as with FAI, you will undergo a MRI of the hip for further evaluation to confirm the diagnosis.

There are 2 main treatments of labral tears in regards to hip arthroscopy, labral debridement and labral repair. Labral tears not amenable to fixation are usually debrided, or trimmed back, to a stable base to the point that the unstable piece of torn labrum no longer causes symptoms. Your surgeon will remove any inflamed tissue in the hip joint and address any other underlying problems during surgery as well. This usually involves shaving some bone off the femoral head-neck junction as well as the hip socket so the bones do not rub against one another.

A labral repair often involves attaching the labrum back to its original site with the use of specialized anchors and sutures. Postoperatively, patients use crutches to aid in walking and are restricted to limited weightbearing and limited hip bending for approximately 4 to 6 weeks while the labrum heals.

Complications

Hip arthroscopy for either FAI or labral tears is not without complications, although the complication rate is low. Complications reported with hip arthroscopy occur at a rate between 1.3% and 6.4%. Most complications are minor and are often self-limiting, but there are several major complications that have been described in hip arthroscopy that the patient should be aware of. These include traction

neurapraxia, where there is a temporary loss of motor and sensory function of nerves surrounding the hip. This occurs when traction is placed on the operative leg to help distract the hip joint in order to gain access for the arthroscope. This often resolves soon after surgery and most patients have a complete recovery. Damage to major nerves and blood vessel structures around the hip joint can also occur. Additionally, damage from instrumentation can happen; but with proper positioning and technique, the incidence of this complication is low.

On the mend

After surgery, you will be given instructions to follow for the weeks and months following surgery, including returning to see your physician for follow-up to see how you are progressing. Some of these instructions will include how to care for your portal sites and when you

can shower or submerge the incisions in water. Additionally, you will be given crutches to use. Depending on the extent and type of repair, you may be on crutches for days, weeks, or months. When the hip has begun healing and the time is appropriate, your physician will refer you to rehabilitation. You should follow your rehabilitation program as instructed at the physical therapist's office and at home. Physical therapy is a part of your treatment; therefore, you should adhere to the rehabilitation regime to achieve your best possible range of motion and functional outcome.

Hip arthroscopy can be an effective procedure and the risk of complications is low, although they do occur. Most patients are pleased with their outcomes and have resolution of symptoms, which allows them to get back to a more active lifestyle.

*Garland J. Gudger, Jr., MD
Columbus, Georgia*

Liposomal Bupivacaine

A NEW OPTION FOR MANAGING PAIN AFTER SURGERY

The use of opioid pain medicine, also referred to as narcotic medicine, has received much attention lately with the epidemic of patient addiction and the concern of over prescribing medications. The problem often begins with chronic pain or after a patient undergoes surgery. For the patient's comfort, the physician typically prescribes narcotic pain medicine in a large dosage and prolonged duration of time to help ease the pain. This increases the likelihood of patient addiction, which can further lead to chronic dependency and in some instances, progression to street opioid use, such as heroin (a drug produced from morphine and sold illegally). The Center for Behavioral Health Statistics and Quality reports that 4 out of 5 new heroin users start out by misusing opioid pain medications.

The opioid epidemic has created a public health crisis, increased medical costs, and formed an ethical predicament for physicians. To overcome these problems, physicians are researching new ways to reduce pain while also reducing the use of opioids. Liposomal bupivacaine is a new treatment surgeons use to manage postoperative pain, which greatly decreases, and in some cases eliminates, the use of narcotic pain medicine.

Bupivacaine is a medicine that has been around for many years. Physicians inject it into a specific area or next to a nerve to decrease the feeling to that area, making it numb, and therefore painless. On its own,

bupivacaine will only last 2 to 4 hours. Therefore, physicians combine it with a medicine called epinephrine, which narrows the small blood vessels around the area so the medicine can last longer. Combined with epinephrine, the bupivacaine can help ease a patient's pain for 3 to 7 hours.

In the latest advancement, the bupivacaine is placed into liposomes. A liposome is a spherical vesicle that acts as a delivery device in our bodies, such as transporting nutrients and medications. In this setting, the bupivacaine slowly releases into the body and provides approximately 72 hours or 3 days of pain relief. This increase of time helps the patient past the initial surge of postoperative pain.

In December 2015, the FDA approved liposomal bupivacaine for "local surgical infiltration". This means that the surgeon can inject the medication into the tissues surrounding the surgical incision during surgery. Today, surgeons use liposomal bupivacaine in conjunction with various orthopedic surgeries to include hip and knee replacements, shoulder, and spine surgery. Hip and knee replacements are 2 of the 7 most common surgeries that carry an increased risk of chronic opioid use. Recent studies on the use of liposomal bupivacaine used in hip and knee surgery show that patients have a decreased length of stay at the hospital, and initially walk better after surgery.

Patients, as well as their physicians, are concerned about the side effects of opioids, the risk of addiction, and prefer a pain management plan that decreases opioid use. Liposomal bupivacaine can help control postoperative pain and greatly reduce the use of opioids after surgery.

*Roman Ashmyan, DO
Columbus, Georgia*

Brachial Plexus

TRAUMATIC NERVE INJURIES

The brachial plexus are nerves that conduct signals to the shoulder, elbow, and hand muscles and provide feeling in the arm. If these nerves become injured you can lose function, sensation, and experience pain. Some injuries to the brachial plexus are minor and brief, while others are severe and can cause permanent disability. These injuries often occur after a traumatic event, such as a sports injury, an automobile accident, or from complications at birth.

Brachial plexus injuries involve the C5, C6, C7, C8, and T1 nerves that originate from the spinal cord in the neck. As these nerves leave the neck, they form the brachial plexus, which weave together then branch as they pass under the clavicle (collarbone) toward the shoulder (Fig. 1). Depending on the extent of the injury and which nerve

is damaged, brachial plexus injuries are sometimes called Erb's palsy, Klumpke palsy, Parsonage-Turner syndrome (brachial plexus neuritis), and burners and stingers. Most brachial plexus injuries are minor and you will recover within a few weeks with limited treatment; however, other injuries can require rehabilitation or surgery and take longer to heal.

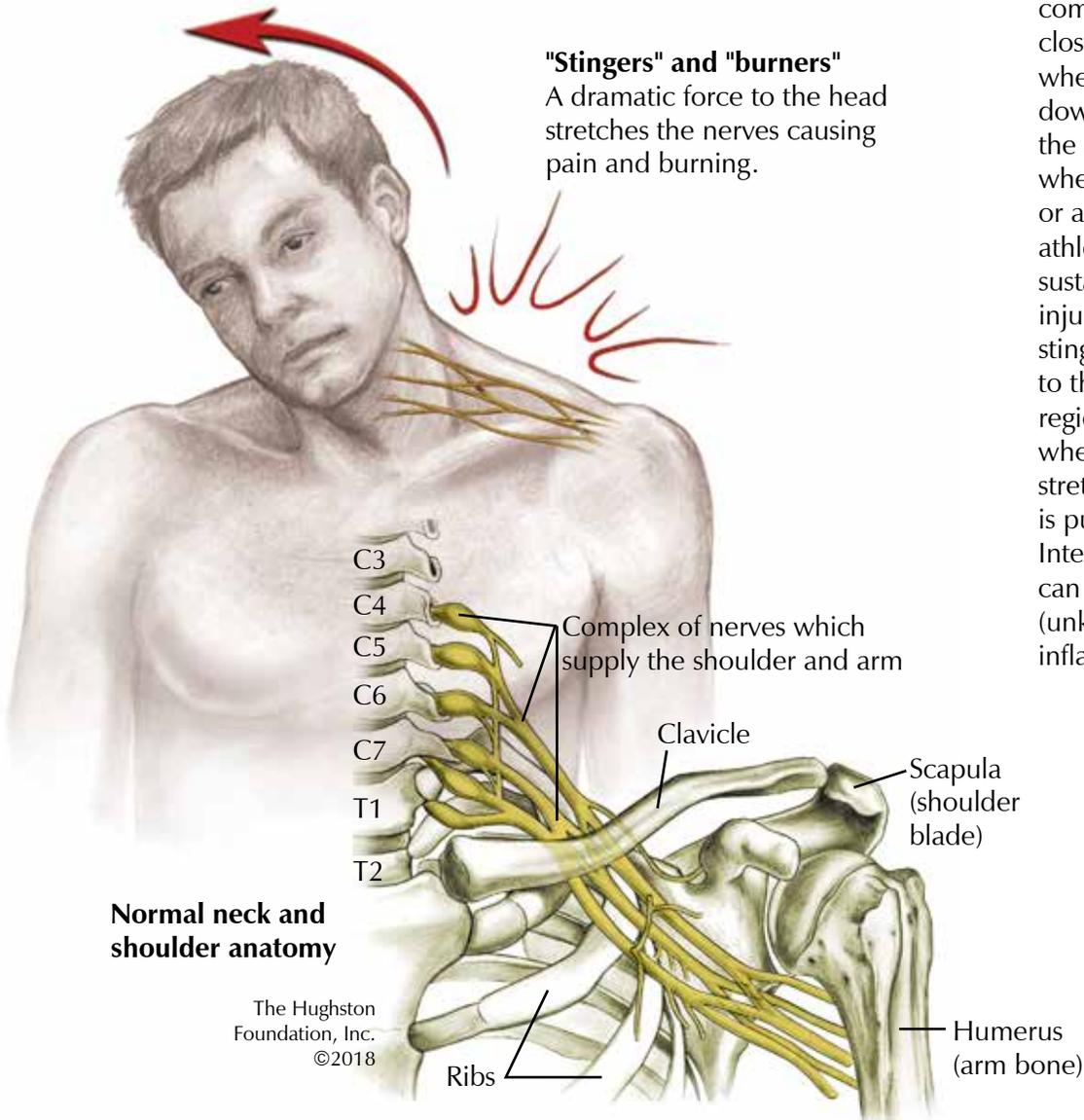
Causes

Often, brachial plexus injuries occur during high-speed automobile accidents, blunt trauma from a fall, or from the violence of a stab or gunshot wound. Difficult births are a major cause of brachial plexus nerve injuries in newborns. The nerve injuries can also result from medical conditions such as inflammation, compression from a growth or tumor, and nerve disease.

The damage occurs when 1 or more nerves are pulled, stretched, compressed, or torn. The nerve injury can be an avulsion (pulled away from the spinal cord), a stretch

(pulled but not torn), or a rupture (stretched with a partial or complete tear). Often, the nerves closer to the neck are damaged when the shoulder is forced down and the nerves closer to the armpit are more likely damaged when your arm is forced upward or above your head. In addition, athletes in contact sports can sustain transient brachial plexus injuries known as "burners and stingers" after sustaining a blow to the neck and shoulder girdle region (Fig. 2). The injury occurs when the arm is forcibly pulled or stretched downward and the head is pushed to the opposite side. Interestingly, brachial plexus insult can also occur in an idiopathic (unknown cause) fashion after inflammation of the nerves.

Fig. 1. Normal anatomy and injury of the neck nerves



Symptoms

For most brachial plexus injuries, only one side is usually affected and depending on the severity and location, the signs and symptoms vary. For example, the minor damage caused by a burner or stinger can produce an electric shock or burning sensation shooting down the arm and numbness and

Fig. 2. Tackle that could result in a nerve injury



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weakness in the limb. The symptoms can last a few seconds or they can last for days. Traumatic brachial plexus injuries can present with partial or complete motor and sensory paralysis of the arm, shooting pains in the affected arm, and an inability to use all or selected muscles on the affected side. These injuries can be transient and slowly resolve over time or can persist for longer periods leading to permanent damage. If you experience a serious injury, such as an avulsion, you may become unable to use certain muscles in your shoulder, arm, or hand. You may experience severe pain or lose feeling and the ability to move the limb. Acute injuries to the brachial plexus often warrant close follow-up with a medical professional.

You should seek medical advice and treatment if a brachial plexus injury is suspected, especially when symptoms persist without improvement. Additionally, you should see a doctor if you have recurrent burners and stingers, weakness in your hand or arm, or experience neck pain.

Screening and diagnosis

A thorough health history and physical exam are of paramount importance in screening patients for potential brachial plexus injuries. Your physician may first order chest, spine, or shoulder x-rays to rule out a fracture or dislocation that can cause entrapment (compression of the nerve) of the brachial plexus. Performing a computerized tomography with myelography

(a CT scan using dye) a few weeks after the initial injury is the current gold standard to identify the nerve injury level. Other imaging modalities that can be useful include magnetic resonance imaging (MRI), electromyography (EMG), nerve conduction velocity (NCV), and other nerve studies based on the discretion of the healthcare provider. If your physician suspects an infectious cause, he or she will include laboratory work in the screening process.

Treatment

The mainstay treatment for brachial plexus injuries remains nonsurgical management with close observation for symptom resolution. The physician conducts frequent and thorough exams over the first 3 to 6 months and performs additional testing as needed to evaluate the recovery. Partial brachial plexus injuries with a halt in neurologic resolution can require surgery. If your physician suspects an inflammatory process, a course of pain control, physical therapy, and oral corticosteroids may be necessary.

Patients with open injuries, progressive neurologic deficits, and penetrating injuries such as gunshot wounds, often require immediate surgical treatment. For patients with a total plexus injury, surgery will likely take place around 4 to 6 weeks after the initial injury.

New advances in nerve surgery are helping to restore movement and function in the shoulder, elbow, and hand, which once was impossible. There are many surgical techniques available depending on the specific injury encountered. Some of these include direct nerve repair, nerve grafting, nerve transfers, muscle or tendon (tissue connecting muscle to bone) transfers, osteotomies (bone surgery), and arthrodesis (fusion of a joint). Reconstruction procedures can take up to 3 years before full recovery occurs, especially since nerve regeneration occurs at a slow rate of approximately 1 mm/day. When comparing injuries of the upper (C5, C6) and lower (C8, T1) brachial plexus, the upper plexus tend to have better outcomes as hand function remains preserved.

Be patient

Nerves heal and regenerate slowly, so you must be patient. Your doctor may prescribe a rehabilitation program to follow to keep your muscles strong and healthy while the nerve heals. Outcomes after sustaining brachial plexus injuries are dependent on the extent and level of your injury. However, given enough time, many brachial plexus injuries heal without lasting damage.

*Devin W. Collins, DO
Columbus, Georgia*

Atrial Fibrillation in Athletes

Atrial Fibrillation is the most common cardiac arrhythmia (heart rhythm) affecting over 5 million people in the United States with projections up to 20 million people by 2030.¹ Physicians define atrial fibrillation as rapid, chaotic electrical impulses in the upper heart chambers known as the atria that result in irregular heartbeats. In the early phases of the disease, abnormal impulses from pulmonary veins—which carry oxygenated blood and connect directly to the left atrium of the heart—trigger the arrhythmia. As the disease progresses, the normal cellular architecture of the atria changes as thicker scar tissue replaces healthy muscle, which in turn causes the atrial fibrillation to worsen. Based on the patient's symptoms, treatment can include medications or catheter ablation (a minimally invasive procedure) to disrupt the faulty signals (**Fig**).

Risk factors

Other than rare genetic disorders, atrial fibrillation is an acquired condition. It often presents in the sixth and seventh decades of life, with a lifetime risk of 25% for people who are over 40 years of age. Typical risk factors for atrial fibrillation include age, heart failure, valvular (heart valve) disease, obesity, sleep apnea, hypertension, diabetes mellitus, and alcohol consumption.¹ In addition to causing cardiovascular symptoms, it increases stroke risk 5-fold and can lead to heart failure. To determine stroke risks, physicians use the CHADS-VASC score (**Table**). Based on a score of 2 or more risk factors, anticoagulants (blood thinning medications) are used to reduce the chance of stroke.



Endurance athletes

Cardiovascular exercise is generally beneficial for patients with atrial fibrillation; however, there are some scenarios where exercise can increase the episodes. Endurance exercise including marathon running, triathlons, and similar long-duration exercise can increase the risk of developing the condition. One study of endurance athletes showed a 2- to 10-fold increase of occurrence compared to sedentary individuals.² In endurance athletes, the left atrium is often enlarged and there is usually some degree of cardiac muscle stiffening. A leading theory for increased atrial fibrillation in endurance athletes includes increased vagal tone. When the vagus nerve controls the heart rate through the parasympathetic nervous system, nerve fibers slow the heart rate—this is called vagal tone. Prolonged episodes of heightened vagal tone, necessary for endurance activities but possibly arrhythmia provoking, is the most established theory. In this scenario, increased vagal tone leads to increased heart rate variability and ectopy (a rhythm disturbance) thereby triggering atrial fibrillation. The phenomenon appears to be more common in men and in those under the age of 60. Additionally, theories involving athletes include increased physical stress on the heart, inflammation, prolonged electrolyte imbalance, remodeling of the heart muscle, and increase in pulmonary vein trigger firing.³

Exercise-induced

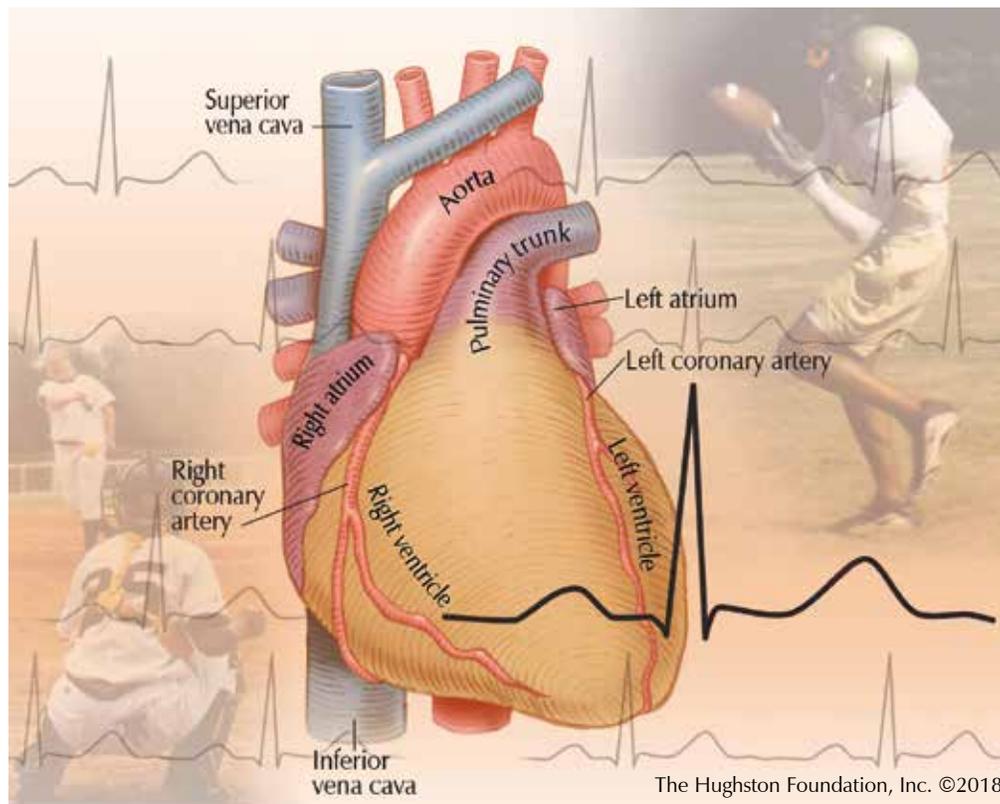
Most patients with exercise-induced atrial fibrillation usually have the mildest form, which doctors define as episodes lasting less than 1 week. To assess the contribution of heavy exertion, physicians often advise their patients to stop endurance training for 3 months.

Table. CHADS-VASC score risk factors and annualized stroke risk.

Risk Factor	Score	CHADS-VASC score and Annual Stroke Risk
Congestive Heart Failure	1	1=1.3
Hypertension	1	2=2.2
Age > 75 years	2	3=3.2
Diabetes Mellitus	1	4=4
Stroke/TIA/Systemic Embolism	2	5=6.7
Vascular Disease	1	6=9.8
Age 65-74 years	1	7=9.6
Sex (Female)	1	8=6.7
		9=15.2

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Fig. Normal heart anatomy & rhythm



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Exercise-induced atrial fibrillation is different from that seen in the general population, although the treatment strategies for the condition remain similar. For those with 2 or more risk factors for stroke, physicians often prescribe anticoagulants. Medical treatment of atrial fibrillation in athletes can be challenging since most medications can slow the resting and exertional heart rate thereby limiting the ability to exercise. Physicians often prescribe anti-arrhythmic medications specifically designed to treat the disease; however, these tend to have other types of unwanted side effects. Catheter ablation in the endurance athlete has become a more favorable option since it provides freedom from the condition and can eliminate the need for long-term medications.

How much is too much?

Despite findings of increased atrial fibrillation in endurance athletes, physicians do not recommend stopping exercise as a means to reduce the risk. Recommendations for weekly cardiovascular exercise regimens totaling 150 minutes remain part of standard practice. In fact, one study reported that a monitored diet and exercise program for 3 months after an ablation procedure greatly reduced the rate of recurrence; therefore, exercise plays a beneficial role in care.⁴ However, researchers need to determine the ideal balance before the risk of atrial fibrillation increases. Strength training, such as moderate weight lifting does not increase or decrease the risks. For athletes taking supplements and consuming energy drinks, there is little information to provide any guidance; however, many of these products contain caffeine and other stimulants that have shown to

trigger atrial fibrillation events. The question of “how much is too much” in exertional activities remains unclear.

Don't overdo it

Atrial fibrillation is a common cardiac arrhythmia that has significant health implications including increased risks of heart failure and stroke. Medications and ablation procedures are often effective along with lifestyle modifications in preventing progression of the condition. Cardiovascular fitness is important in reducing episodes; however, extreme training and endurance events can increase the risks. Moderate exercise training regimens are likely the best strategy to reduce the incidence of atrial fibrillation in athletes.

Michael L Bernard, MD, PhD
New Orleans, LA

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Send inquiries to Medical Writing, The Hughston Foundation, Inc.,
 P.O. Box 9517, 6262 Veterans Parkway, Columbus GA 31908-9517 USA.

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