



Hughston Health Alert

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Stingers and Burners

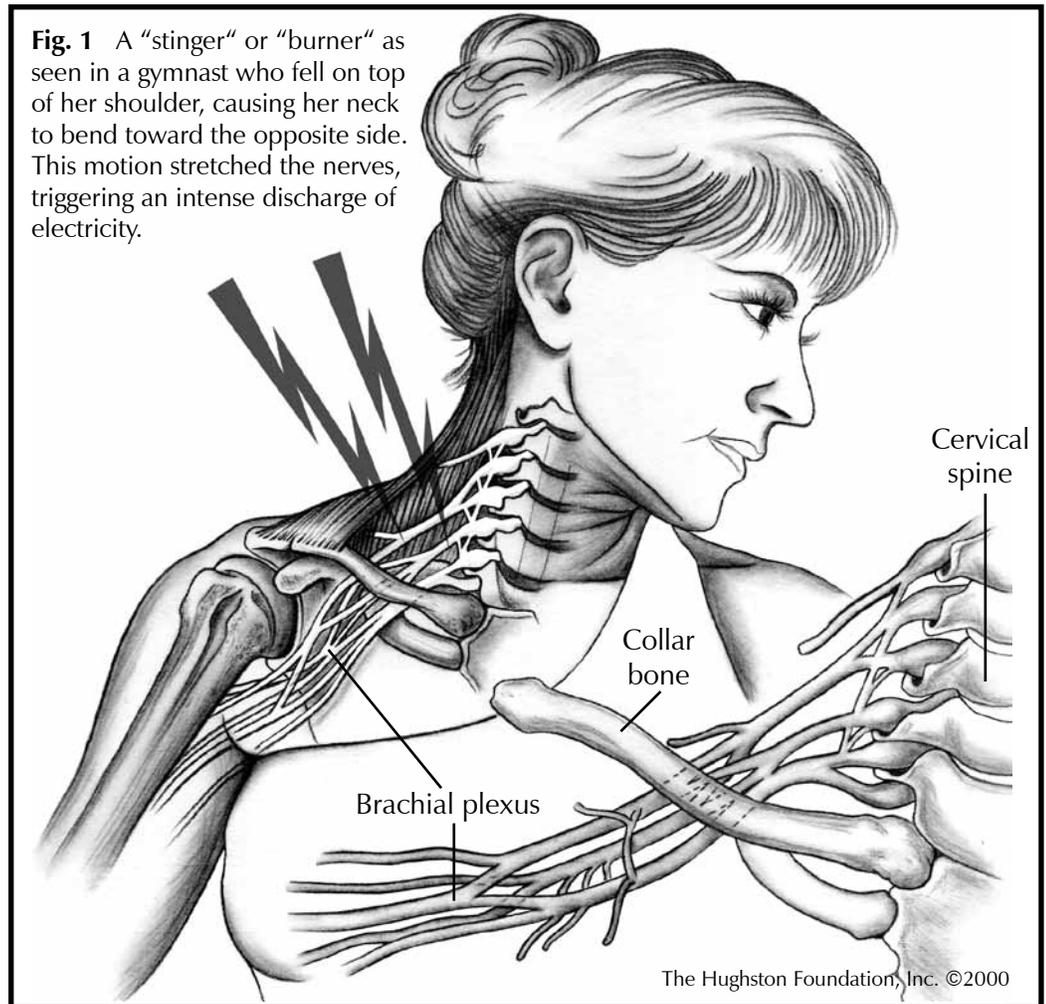
Few sports injuries are as eye-opening for the athlete as a "stinger" or "burner." This intense neurologic (nerve) event occurs most commonly in football players. It also can occur in people who participate in wrestling, cycling, gymnastics (Fig. 1), snow skiing, martial arts (Fig. 2), or other sports. This article discusses the condition in football players and highlights several key points.

What is a stinger or burner?

A stinger or burner is an intensely painful nerve injury. The nerves that give feeling to the arms and hands originate from the cervical (neck) spinal cord. As these nerves leave the neck, they form the brachial plexus (see Fig. 1). They weave together then branch as they pass under the clavicle (collar bone) on the way to the shoulder.

Nerve injury often happens when the athlete makes a hard hit using his shoulder. The direct blow to the

Fig. 1 A "stinger" or "burner" as seen in a gymnast who fell on top of her shoulder, causing her neck to bend toward the opposite side. This motion stretched the nerves, triggering an intense discharge of electricity.



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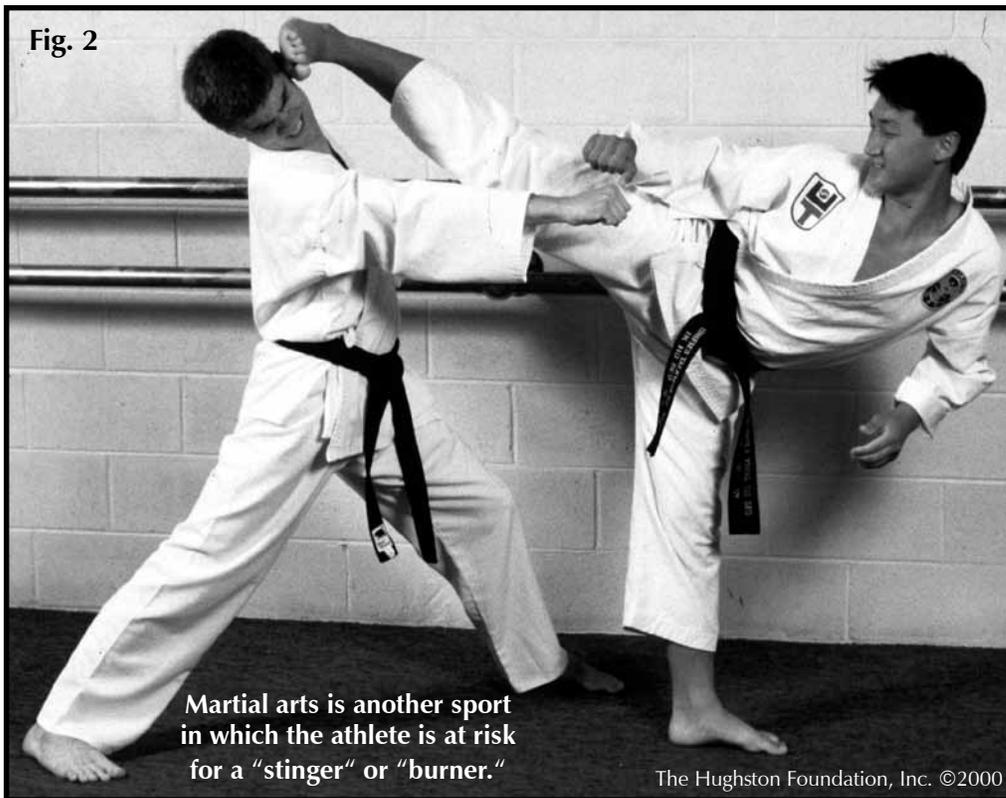
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top of the shoulder drives it down and causes the neck to bend toward the opposite side. This motion severely stretches or compresses the nerves and triggers an intense discharge of electricity. For a few seconds, the electricity shoots down the nerves to the tip of the fingers.

After this intense electrical discharge, the nerves' motor fibers that allow movement in the arm do not function well. The dysfunction is evident by weakness in the arm. The weakness often involves the muscles that allow the athlete to lift the arm away from the body, to bend the

FOR A HEALTHIER LIFESTYLE

Fig. 2



elbow, and to grip. Symptoms also include sensations of tingling and of burning or stinging pain in the arm and hand. The extent of the damage varies considerably. The pain usually lasts only a few minutes, but the weakness can last weeks, months, or years. Rarely, the injury may cause permanent damage.

Treatment of a stinger or burner usually begins as soon as the player runs off the field with the limp arm hanging by his side. The certified athletic trainer, physical therapist, or team doctor carefully examines the cervical spine, evaluates nerve function in the neck and upper back, tests muscle strength, and tests reflexes. *If the athletic trainer, physical therapist, or doctor suspects that the athlete has a spinal cord injury, he or she treats the condition as a medical emergency with full spinal precautions.*

How do I know it's a stinger and not something else?

Stingers or burners produce symptoms in only one arm. Injuries

that can accompany a stinger include fractures, dislocations, or damage to the ligaments (tissue connecting two bones) of the cervical spine. Therefore, when treating an athlete who has a stinger, the doctor takes appropriate precautions to protect the spine.

A spinal cord injury usually causes symptoms involving more than just one arm and possibly the legs. This injury must be treated as a medical emergency. A contusion (bruise) to the spinal cord in the neck during athletic competition can lead to temporary quadriparesis, producing symptoms of pain and tingling in both arms and both legs. Certain athletes may be more prone to this injury because the space in their necks through which the spinal cord travels is narrow (see "Congenital Spinal Stenosis," p. 3). Other injuries to the spinal cord can cause lasting, serious nerve damage. The health care provider always treats neck injuries with full precautions until serious injuries are ruled out.

When can the injured athlete go back in the game?

If the certified athletic trainer, physical therapist, or team doctor determines that the athlete's sense of feeling, strength, neck motion, and reflexes have returned to normal, the athlete may be able to return to the game. All protective gear should be inspected to ensure it fits properly and is in good condition. Additional shoulder pads or a neck roll may be added. Do not attach restraining straps or other similar devices to the helmet because they can lead to more severe injuries. The athlete should be examined frequently during the game for further problems including recurrence of symptoms.

How should the athlete be treated following the game?

After the game, the athlete should be re-examined in the locker room and, if necessary, at his doctor's office. An athlete who has a stiff neck following a stinger is more prone to further, more serious injury and needs a thorough evaluation of the neck, shoulder, and nerves by an orthopaedic doctor. An athlete who has had a stinger cannot return to play until the health care provider notes that he has no pain or tenderness and that he exhibits full range of motion and strength in the neck, shoulder, and arm.

How do we prevent these injuries?

Preventing recurrent stingers is important. Subsequent injuries tend to be increasingly severe and can damage the nerve permanently. Athletes, coaches, officials, athletic trainers, and parents need to ensure that athletes follow these three minimal guidelines. First, use proper technique in tackling as mandated by the 1979 football rule outlawing spearing or head tackling. Second, make sure that the shoulder pads and neck roll, if used, fit properly and

are in good condition. Third, before the season begins, participate in an exercise program to develop full range of motion and protective strength of the neck and shoulder muscles.

*Kurt E. Jacobson, M.D.
Columbus, Georgia*

Congenital Stenosis of the Cervical Spinal Canal

Congenital stenosis of the cervical spinal canal is the narrowing of the spinal canal in the neck (Fig. 1). This condition, which exists at birth but is not hereditary, puts the affected person at increased risk of injuring the spinal cord.

The spinal canal lies within the spine and encases the spinal cord. The vertebral body (back bone) forms the front and the lamina (bony covering) forms the back of this canal. The spinal cord travels from the brain through the canal to the lower back, giving feeling and movement to the entire body.

Am I at risk for injury?

Spinal cord injury can occur when the neck is forced to bend too far forward or backward or is compressed through a blow to the top of the head. With these motions, the spinal cord can be pinched within the narrow canal.

Athletes who have cervical spinal stenosis and participate in contact sports (e.g., football, martial arts, basketball) are at risk for serious nerve injuries due to pinching within the spinal canal. Symptoms include burning pain, tingling, or numbness in both arms and possibly both legs. The symptoms usually subside within a few minutes. Occasionally, they

last one or two days. Bruising of the cervical spinal cord can result in transient quadriplegia, producing temporary pain and loss of movement in both arms and both legs. Severe bruising of the spinal cord can result in permanent quadriplegia (loss of movement and feeling in the arms and legs).

Diagnosis and treatment

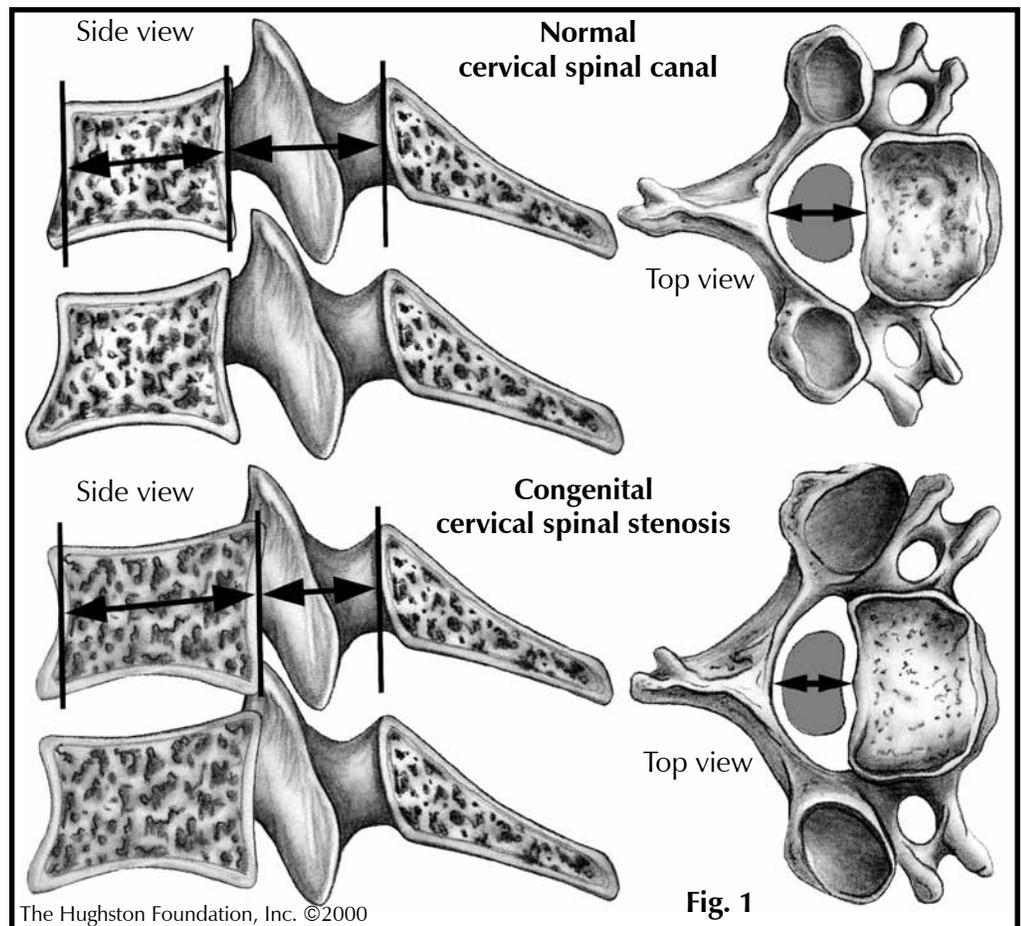
A suspected spinal cord injury should be treated as a medical emergency, with the health care provider taking full precautions to protect your spine and to transport you by ambulance to the hospital. X-rays of the cervical spine are taken to find out what is causing the symptoms. If your spinal canal is narrowing, the x-rays can expose the condition. Sometimes, they reveal other problems including congenital fusion (permanent union of two vertebrae), degenerative

changes, fractures, and damage to the ligaments (tissue connecting two bones) that contribute to the symptoms.

To treat your neck injury, the doctor prescribes medication and rest and immobilizes your neck with a cervical collar. In certain cases, you need surgery to correct the problem and relieve the symptoms.

Can I still play sports?

Your health care provider decides whether you can return to contact sports. You cannot return to play if you have temporary quadriplegia accompanied by cervical instability (excessive motion between the vertebral bodies), a spinal fracture, a recent disc herniation (disc bulging into the spinal canal), or significant degenerative changes. If you have had repeated episodes of temporary quadriplegia, you should not participate in contact sports.



Returning to practice or competition with one of these conditions may result in severe, permanent damage to the nervous system.

Researchers have found that certain athletes who have had one episode of temporary quadriplegia but no accompanying injuries can return to contact sports without an increased risk of permanent nerve damage.¹ If the health care provider allows you to return to contact sports, you first need to regain maximum strength in your neck by stretching and strengthening the muscles. If you play football, avoid using your head to tackle and modify your shoulder pads according to your health care provider's directions.

Long-term problems

Degenerative disc disease (wearing down of shock-absorbing structures between vertebrae), bone spurs (overgrowth of bone), or vertebral subluxation (one vertebral body slipping forward onto the next) further narrows the spinal canal as the person with cervical spinal stenosis ages. These changes can lead to long-term spinal cord compression, resulting in loss of nerve function such as numbness, weakness, and loss of fine motor control in the arms and hands and difficulty with walking. Sometimes, symptoms are so severe that you need surgery to relieve them. Figure 2 shows the magnetic resonance imaging scan of a person with congenital stenosis of the cervical spinal canal and accompanying degenerative disc disease that is compressing the spinal cord. This person needed decompression (surgical relief of pressure on the spinal cord and nerve roots) and spinal fusion to relieve the symptoms.

Congenital stenosis of the cervical spinal canal puts athletes at risk for nerve injuries. Symptoms of these injuries are usually temporary; however, you must have a health care provider examine your neck to



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determine the extent of the injury and whether you can return to contact sports. For long-term problems associated with the condition, your health care provider has treatment options available to help relieve your symptoms.

John D. Dorchak, M.D.
Columbus, Georgia

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Sport-Related Concussion

Concussion is the most common head injury that occurs during sport participation, with more than 250,000 injuries reported annually in football players alone. In fact, 20% of high school football players experience a concussion each year. Sport-related concussions are usually witnessed, are generally mild, are usually not associated with other injuries, and sometimes are treated initially by nonmedical personnel. Athletes most at risk for a sport-related concussion participate in football, boxing, hockey, lacrosse, rugby, equestrian events, and snow skiing.

What is a concussion?

A concussion is a temporary alteration in consciousness that occurs immediately after a blow to the head. The condition is the mildest form of traumatic (sudden, forceful) brain injury. However, the cumulative effect of having more than one concussion can be permanently damaging or deadly.

Symptoms

Concussions range in severity. A mild concussion disrupts function but does not render the athlete unconscious. The athlete may describe a feeling of having his or her "bell rung" and may be confused momentarily. The brain repairs itself quickly and completely. A moderate concussion results in longer lasting confusion and amnesia in the conscious athlete. For example, the athlete may not remember the events leading up to the injury or what period of the game it is. The brain has microscopic tissue damage that can take up to six months to repair completely. A severe concussion results in loss of consciousness and is treated as an emergency.

One severe concussion or

successive mild or moderate concussions can cause permanent damage to the brain or can cause postconcussive syndrome. The symptoms of postconcussive syndrome include headaches, dizziness, insomnia, poor concentration, memory difficulties, irritability, personality changes, anxiety, or depression. As many as 30% of professional football players have symptoms of this disorder.

A rare and usually deadly result of concussion is second impact syndrome. This syndrome develops when an athlete receives another concussion before fully recovering from the previous concussion. The second concussion may occur after a seemingly minor injury such as a blow to the chest that is strong enough to jar the brain. After the injury, rapid, severe swelling of the brain leads to uncontrollably high pressure in the skull. At first, the athlete appears dazed, but, within a few seconds or minutes, he or she collapses and develops rapid dilation of pupils, loss of eye movement, and respiratory (breathing) failure.

Treatment

Because a concussion damages the brain, an athlete must be examined by a medical professional before returning to play. Several grading systems have been devised to help team doctors and certified athletic trainers (ATCs) examine an athlete with a sport-related concussion and prevent further, more serious brain damage. One of the most frequently used systems was developed by the Colorado Medical Society and is described here.

An athlete with a **Grade 1** (mild) concussion must stop participating. He or she can return to play only if the examiner determines that nervous system function is normal and if no symptoms (i.e., amnesia, postconcussive syndrome) are displayed at rest and with exertion

(e.g., running in place) for at least 20 minutes. Because another concussion during the same game is more likely now and can cause further damage, the doctor or ATC may consider barring the athlete from play that day.

After returning to play, the athlete must be examined regularly by the same doctor or ATC throughout competition. If symptoms appear, the athlete must stop competing that day and have a magnetic resonance imaging and a computed tomography (CT) scan to examine the brain.

If the athlete suffers a second Grade 1 concussion in the same game, he must stop playing that day. He or she can return to play only when symptoms have not been present for at least one week. After a third Grade 1 injury, competition ends for the season. The athlete can participate in contact sports (e.g., football, basketball) after three months only if symptoms are not present at rest and with exertion.

An athlete with a **Grade 2** (moderate) concussion must stop participating in competition that day and must be re-examined by a doctor the next day. He or she can return to contact sports only if nervous system function is normal and no symptoms are present at rest and with exertion for at least one week.

After a second Grade 2 concussion, the athlete cannot return to play for at least one month and may be barred from play for the season. Suffering a third Grade 2 concussion ends play for the season.

A **Grade 3** (severe) concussion is considered an emergency. The unconscious athlete must have the cervical (neck) spine immobilized as a precaution and must be transported by ambulance to a hospital for medical evaluation and a CT scan of the head. The athlete can go home under the supervision of a family member only when the results of the nervous system evaluation and the CT scan are normal. He or she can return

to contact sports one month after injury only if no symptoms are present at rest and with exertion for at least two weeks.

After a second Grade 3 concussion, the athlete must stop participating for the season and must consider not returning to any contact sport.

If the athlete continues to have symptoms of postconcussive syndrome, he or she needs to see the doctor again. The doctor may prescribe mild analgesics to relieve some of the symptoms and may work with the athlete to rehabilitate brain function, thought processes, or behavior.

Prevention

Wearing a good quality helmet, wearing a mouthpiece, and strengthening the neck muscles can help prevent concussion. Although athletes may be eager to return to play, they need to be honest with the examiner, telling him or her exactly how they feel. Remember, each successive concussion causes more brain damage, which can lead to severe discomfort, permanent brain damage, or death.

Marc Goldman, M.D.
Columbus, Georgia

Further reading

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The Marfan Syndrome

The Marfan syndrome has been publicized in sport magazines because of the sudden, untimely deaths of Olympic volleyball player Flo Hyman and collegiate basketball player Chris Patton who had this condition. The Marfan syndrome is an inherited, degenerative disorder of the connective tissue, which gives shape and structure to tissues in the body and holds them in place. It affects several organ systems including the ocular system (eyes), the cardiovascular system (heart and blood vessels), and the skeletal system (bones and joints). The condition is considered a syndrome because the physical symptoms occur together frequently enough for a pattern to be recognized. More than 50,000 people in the United States have the Marfan syndrome.

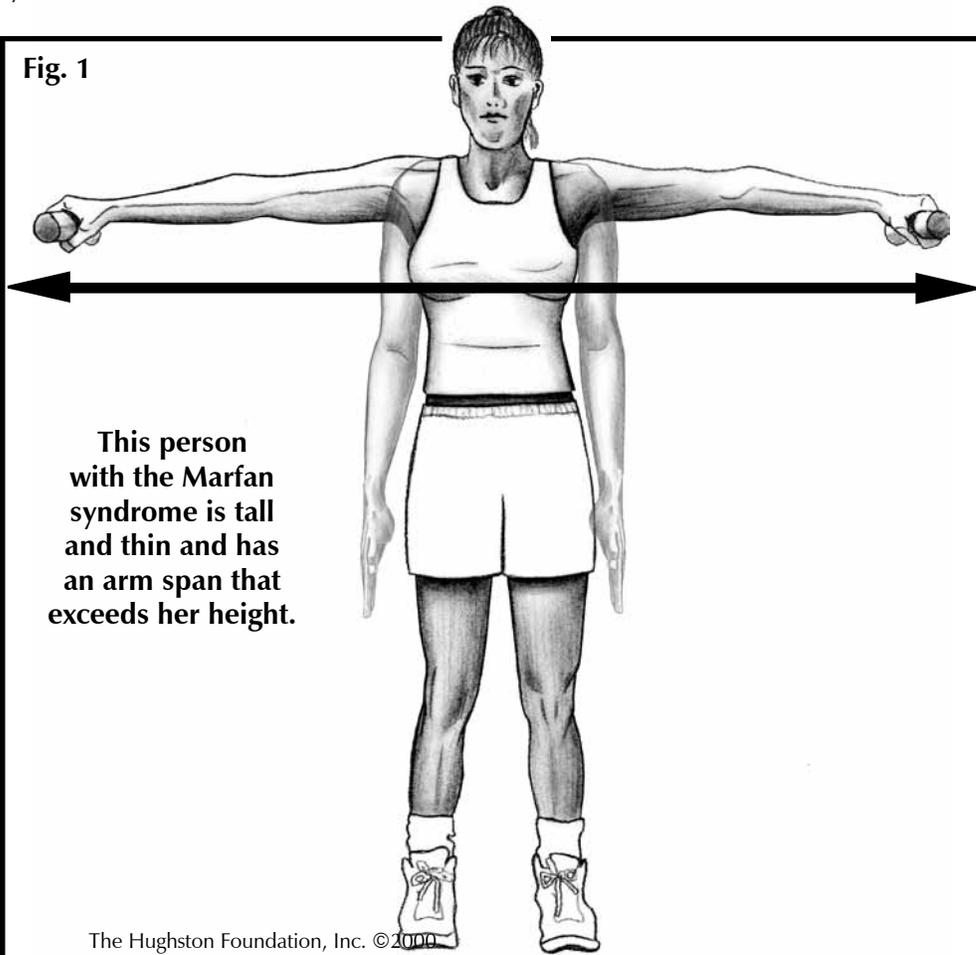
Signs and symptoms

The number and severity of symptoms vary from person to person. The lenses that enable the eyes to focus on objects can be intact or dislocated (off center). The heart can produce no symptoms until middle age, or its aorta (large artery carrying blood out of the heart) can develop a life-threatening aneurysm (i.e., the thin wall of the aorta balloons out under pressure) during adolescence. The tubular long bones (e.g., arms, legs, and fingers) can grow until the person is slightly taller than average or until the person is much taller than average. The breastbone can appear normal or can point outward (pigeon chest) or inward (funnel chest). In an extreme case, the signs and symptoms are obvious; the person is unusually tall and thin, wears thick glasses, and tires out easily with moderate physical activity. In a typical case, the affected

person is taller than average for his or her age, is near-sighted, has an arm span exceeding his or her height (Fig. 1), is loose jointed (especially in the knees, wrists, and fingers) (Fig. 2), is excessively flexible or limber, has flat or “rocker bottom” feet, and has kyphoscoliosis (an abnormal forward and sideways curve of the back bone) (Fig. 3).

Because of the physical characteristics that can accompany the Marfan syndrome, the term has been used loosely — and sometimes incorrectly or without evidence — to describe any person who is tall and thin and has long arms and legs. An unsuccessful proposal was made in the 1980s for athletes in the National Basketball Association to undergo testing for the Marfan syndrome. Without conclusive evidence, historians and medical professionals have debated whether Abraham Lincoln had the Marfan syndrome.

Fig. 1



This person with the Marfan syndrome is tall and thin and has an arm span that exceeds her height.

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Diagnosis

Diagnosing the Marfan syndrome is difficult because the number and severity of symptoms affecting each person varies. The doctor may first recognize that you demonstrate some symptoms of the disorder when treating you for a dislocated hip, kneecap, or jaw; groin pain due to a hernia; or spontaneous leakage of air from the lungs into the chest cavity.

In addition to the physical examination, the doctor records your family's medical history. He or she even looks at photographs to find out whether your family members have any physical characteristics that could be related to the Marfan syndrome.

Treatment

The Marfan syndrome cannot be cured. However, a treatment plan customized to your needs may help improve the quality and length of your life. Treatment includes annual echocardiograms (sound wave picture

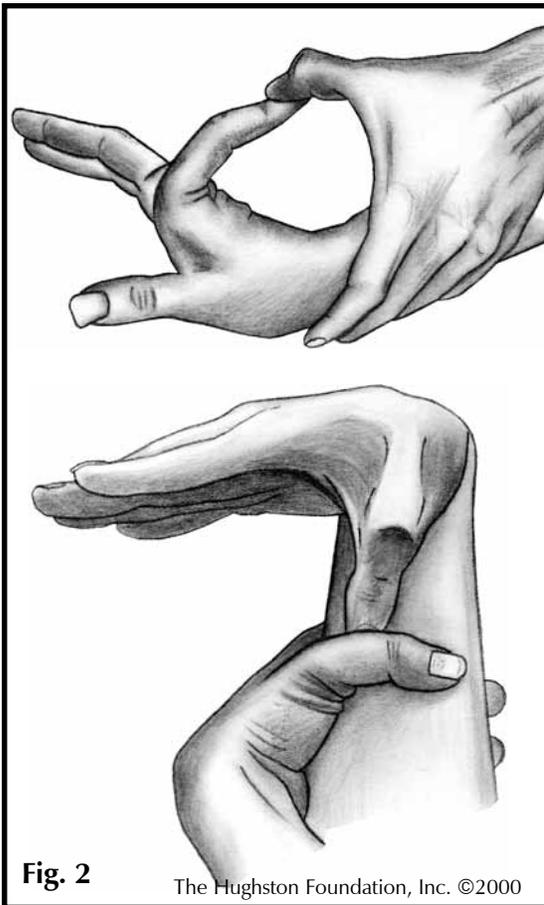


Fig. 2 The Hughston Foundation, Inc. ©2000

condition involve no contact and a low level of intensity. You may be able to walk briskly, play golf, bowl, and leisurely ride your bicycle. Your doctor can tell you about the benefits, risks, and expected outcome of participating in different types of sports from a high-intensity, contact sport like rugby to a low-intensity, non-contact sport like golf. Based on your condition and abilities, the doctor can help you find a sporting activity that is safe and fulfilling.

*John M. Henderson, D.O., FAAFP;
Bruce Getz, ATC;
and Kelli Bowermeister
Columbus, Georgia*
For more information, contact the
National Marfan Foundation,
382 Main Street,
Port Washington, NY 11050,
(516) 883-8712, (800) 8-MARFAN,
<http://www.marfan.org>.

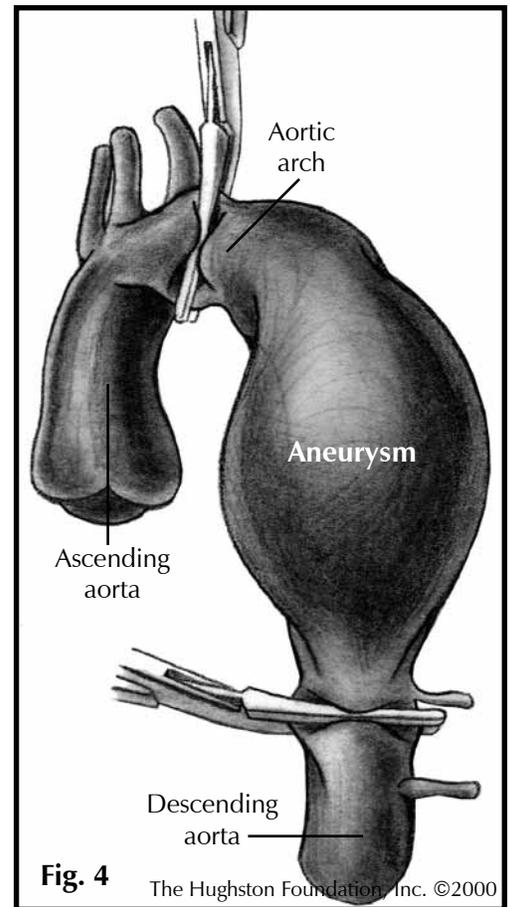


Fig. 4 The Hughston Foundation, Inc. ©2000

of the heart) and electrocardiograms (recording of the heart's electrical rhythms), periodic eye examinations by an ophthalmologist, evaluations of the skeletal system (especially for growing children and adolescents), medications, and lifestyle adaptations.

Participation in sports

Talk with your doctor about the limits for safe participation in sports and pick your activities carefully. Avoid strenuous activities such as weight training, high-impact aerobics, and scuba diving that can aggravate an existing aortic aneurysm (Fig. 4). Avoid contact sports such as boxing, hockey, football, and rugby that put you at risk for fully dislocating an already loosened lens and for damaging the aorta. Avoid sports such as skiing, mountain climbing, gymnastics, and wrestling that put your loose joints at risk for injury.

Sports better suited to your

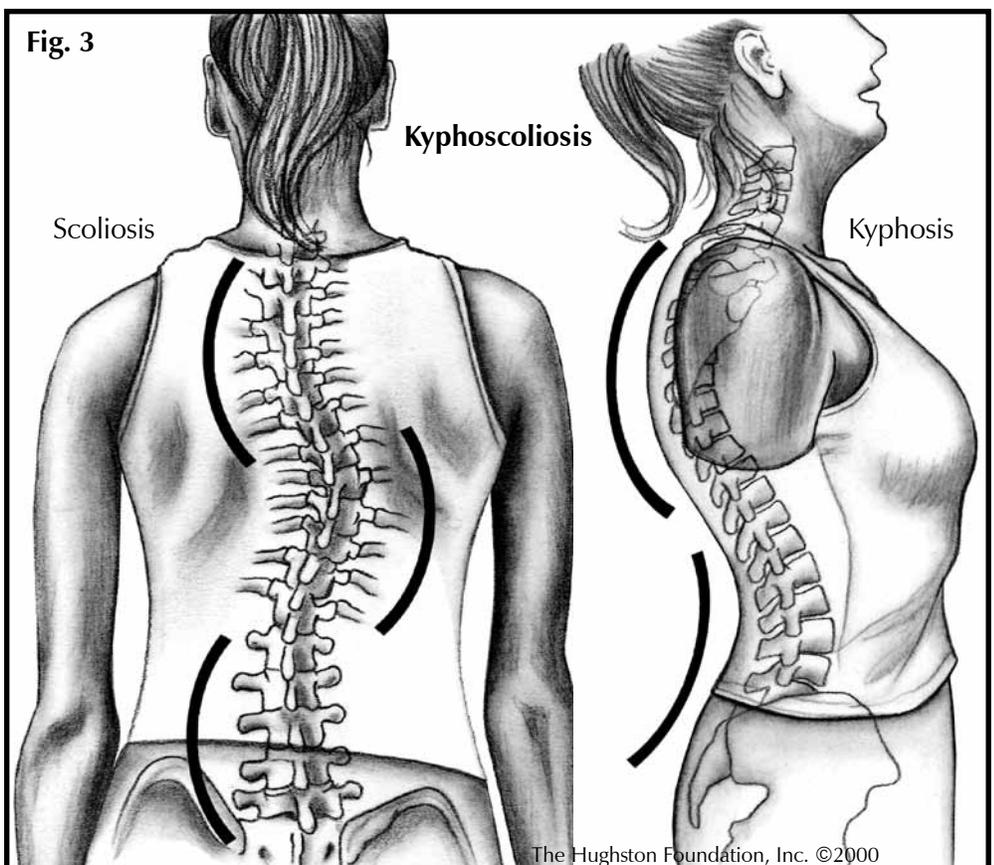


Fig. 3

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Why Wear a Mouthpiece?

Blows to the jaw during sports participation can cause serious, costly injuries to the mouth, teeth, jaw, and head. Studies from the National Youth Foundation for Safety show that an athlete involved in a contact sport has a 10% chance each season and a 33% to 55% chance during an athletic career of receiving these types of injuries.

In the 1960s, Dr. Jack Hughston was instrumental in mandating that all high school football players in the United States wear mouthpieces. He and others involved in the care of athletes found that wearing mouthpieces helped prevent injuries, ranging from tooth loss to concussion.

At less than \$2, the cost of purchasing and wearing a mouthpiece is low compared with the cost of treating an injury. Replanting a tooth can cost about \$5000, and having a concussion carries a potential cost of brain damage (see "Sport-Related Concussions," p. 4). Therefore, wearing mouthpieces while participating in contact sports is important. When worn as designed, they offer inexpensive, simple prevention of injuries.

*Bruce Getz, ATC
Columbus, Georgia*

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

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Health Hint

Weeds, trees, and grasses are in full bloom, producing pollen. Your immune system may react to pollen with sneezing, runny nose, and itchy eyes. To reduce your exposure to this allergen, wear a tight-fitting facemask while mowing the lawn and stay indoors with the windows closed and air conditioning on when the pollen counts are high.



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