Hughston Health Alert

6262 Hamilton Road P.O. Box 9517 Columbus GA 31908-9517

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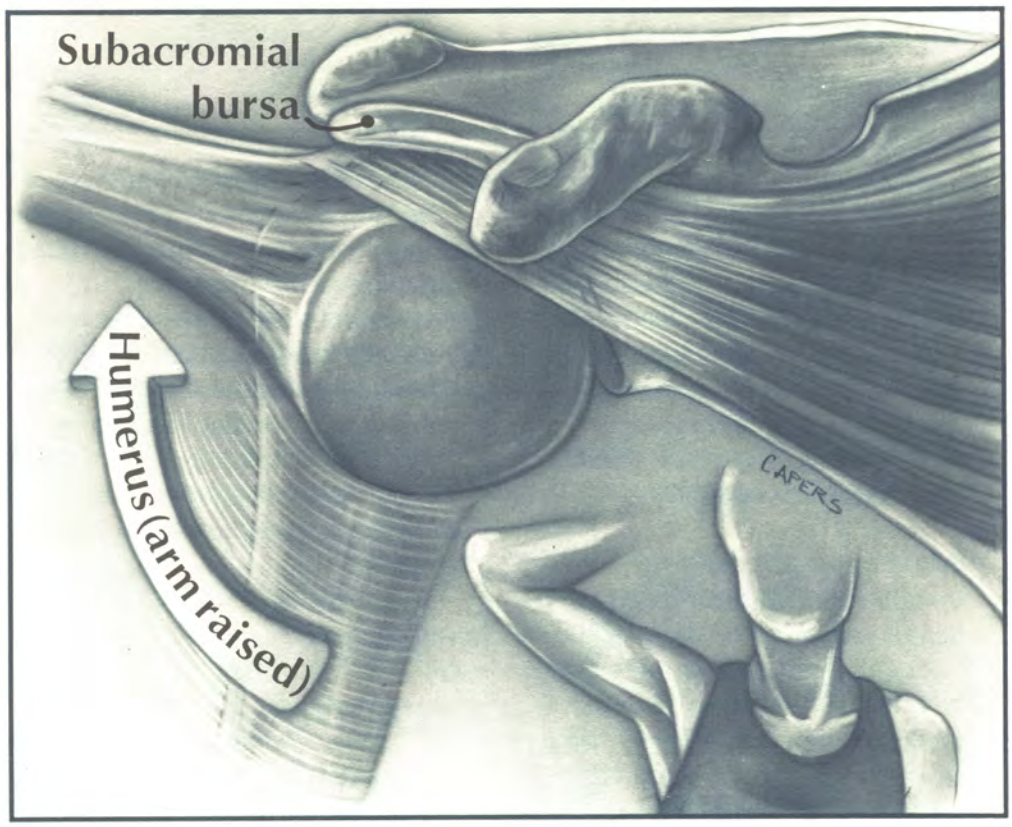
Overuse Injuries to the Shoulder

Shoulder soreness in throwing and racquet sports

The shoulder, the most mobile joint in the body, is built more for function than for stability. Soft tissues (the muscles, ligaments, and tendons of the shoulder), rather than bone, provide stability and strength to the joint. Activities performed with the arm above the shoulder, such as throwing, swimming, or serving in tennis, put stress on these tissues. Traumatic injury or small repetitive injuries to the shoulder occur frequently in recreational, or "weekend," athletes, as well as in competitive athletes. The most common shoulder problems are instability and rotator cuff impingement.



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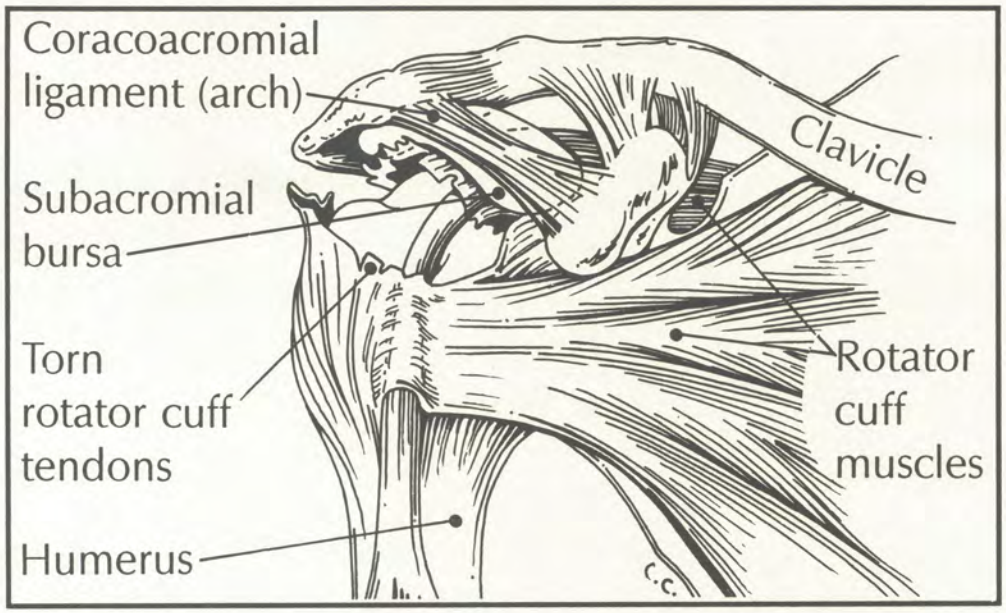
Anatomy of the shoulder

The rotator cuff is a group of muscles and tendons that stabilizes the ball and socket shoulder joint during movement. As the arm is raised, the rotator cuff keeps the ball, or head of the humerus (the upper arm bone), centered in the shoulder socket (see illustration). The subacromial bursa is a thin sac of fluid found on top of the rotator cuff tendons. This sac of fluid reduces friction and cushions the gliding movement of the tendons as they pass beneath the coracoacromial arch on their way to the point where they attach to the humerus.

Subluxation

Subluxation of the shoulder is the abnormal movement of the ball partially out of the socket (partial dislocation). A complete dislocation occurs when the ball comes completely out of the socket. These



abnormal movements occur when great stress is placed on the shoulder, and the muscles and ligaments that stabilize the shoulder fail to do their job. This instability often leads to secondary problems such as bursitis, tendinitis, and tendon rupture. Some patients have normally loose, or hyperlax, shoulders, which should not be confused with instability.

What is impingement?

Impingement syndrome occurs when the subacromial bursa or the rotator cuff tendons become irritated and swell, causing pressure in the joint under the coracoacromial arch (see illustration). It is a common disorder related to repetitive use of the arm in an overhead position. It can range in severity from mild bursitis (inflammation) to rupture of the rotator cuff tendons, which are important to shoulder function.

Shoulder instability can also cause impingement of the rotator cuff. When the head of the humerus slips partially out of the joint with the arm elevated, the rotator tendons can get "sandwiched" between the ball and the overlying bone (the acromion). This leads to rotator cuff irritation and eventual tearing of the tendons.

What can be done?

Initially, the treatment for patients with overuse injuries from racquet or throwing sports is nonoperative. More than half of the patients with shoulder instability can be successfully treated by strengthening the muscles that stabilize the shoulder joint. Surgical repair is indicated only if the shoulder remains unstable after the patient has completed an aggressive strengthening program.

Treatment for a patient with impingement syndrome or a rotator cuff tear is primarily nonoperative and includes rest, modification of activities, non-steroidal anti-inflammatory medications, and physical therapy to strengthen the muscles that support the shoulder. Surgery to remove bone spurs or to repair rotator cuff tendon tears is reserved for patients who do not improve with this nonoperative treatment.

Preventive treatment that strengthens the shoulder muscles (see Shoulder Strengthening, p.3) in athletes who participate in overhead sports is crucial because it minimizes their chances of developing shoulder instability or impingement symptoms.

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ATHLETIC TRAINING CORNER

Muscle Cramps

If you have been exercising or participating in sports this summer, you may already have experienced pain from muscle cramps. Cramping occurs for several reasons: fatigue, lack of proper conditioning, depletion of minerals and electrolytes from the body, dehydration, and weather conditions. Remember, humidity plays a major role by not allowing your body to cool off properly. This can cause cramping and can even lead to a more serious heat illness -- heat stroke. Many times during the early morning and evening hours the temperature may feel cool, but the humidity is very high; you can still suffer painful muscle cramps under these conditions.

Guidelines

To help prevent muscle cramps you should follow these guidelines:

- Follow a conditioning program that gradually acclimatizes your body to environmental conditions.
- Drink plenty of nonalcoholic, noncaffeinated fluids before, during, and after exercise. After you have quenched your thirst, drink at least one more glass.
- Take periodic water breaks in a shaded area or in an air-conditioned locker room to reduce the amount of body fluids lost.
- Eat a well-balanced diet to replace lost minerals.

When muscle cramps do strike, these steps may help:

- Slowly stretch the affected muscle.
- Gently massage the area.
- Apply compression.
- Increase your fluid intake.
- Apply an ice pack and elevate the affected extremity after the cramp subsides.

Keith Webster, M.A., A.T.,C.
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Shoulder Strengthening

Preventing overuse injuries of the shoulder

Have you ever wondered about that pain in your shoulder after tossing a ball with your child or after playing your first game of tennis in the spring? Medical terms such as "tennis shoulder," bursitis, tendinitis, or impingement syndrome can be lumped into a category of injuries that we refer to as "overuse" injuries and are different from traumatic injuries such as a fall that causes a bone to break or a ligament to tear. Overuse injuries are caused by normal, everyday stresses that we apply to our muscles, ligaments, and tendons when we use our arms.

The damage to our muscles from stress usually heals with rest; however, in some instances, when stresses are at a level greater than normal, the tissues may not be strong enough or flexible enough to handle the load. This could be likened to catching a 10-pound fish on a 2-pound test line. You might be able to do it once or twice, but after a while the line breaks. The same thing happens to our body when it's not allowed enough time for recovery or enough time to get used to a new activity, such as beginning to play tennis again or participating in baseball or softball practice.

The best way for an athlete to prevent overuse injury is to maintain a good strengthening and flexibility program for the shoulder in general, and the rotator cuff tendons specifically, because they are usually the tissues injured. These exercises are also helpful in rehabilitation of an injury in which the initial pain and soreness have lessened.

Three simple exercises can help you prevent overuse injuries and also help you return to your sport after injury: 1) prone horizontal abduction, 2) side-lying external rotation, and 3) the towel stretch (see exercises below). Just like the saying goes, "an ounce of prevention is worth a pound of cure." We recommend that you try these exercises for 2 to 4 weeks before you begin to play softball or tennis again.

If an injury does occur, ice therapy is the best treatment. If the pain does not decrease, consult your physician to obtain an accurate diagnosis and recommendations for the appropriate medication or a physical therapy program that will get you back on the courts or in the ball game.

Tim Uhl, M.S., P.T., A.T.,C.
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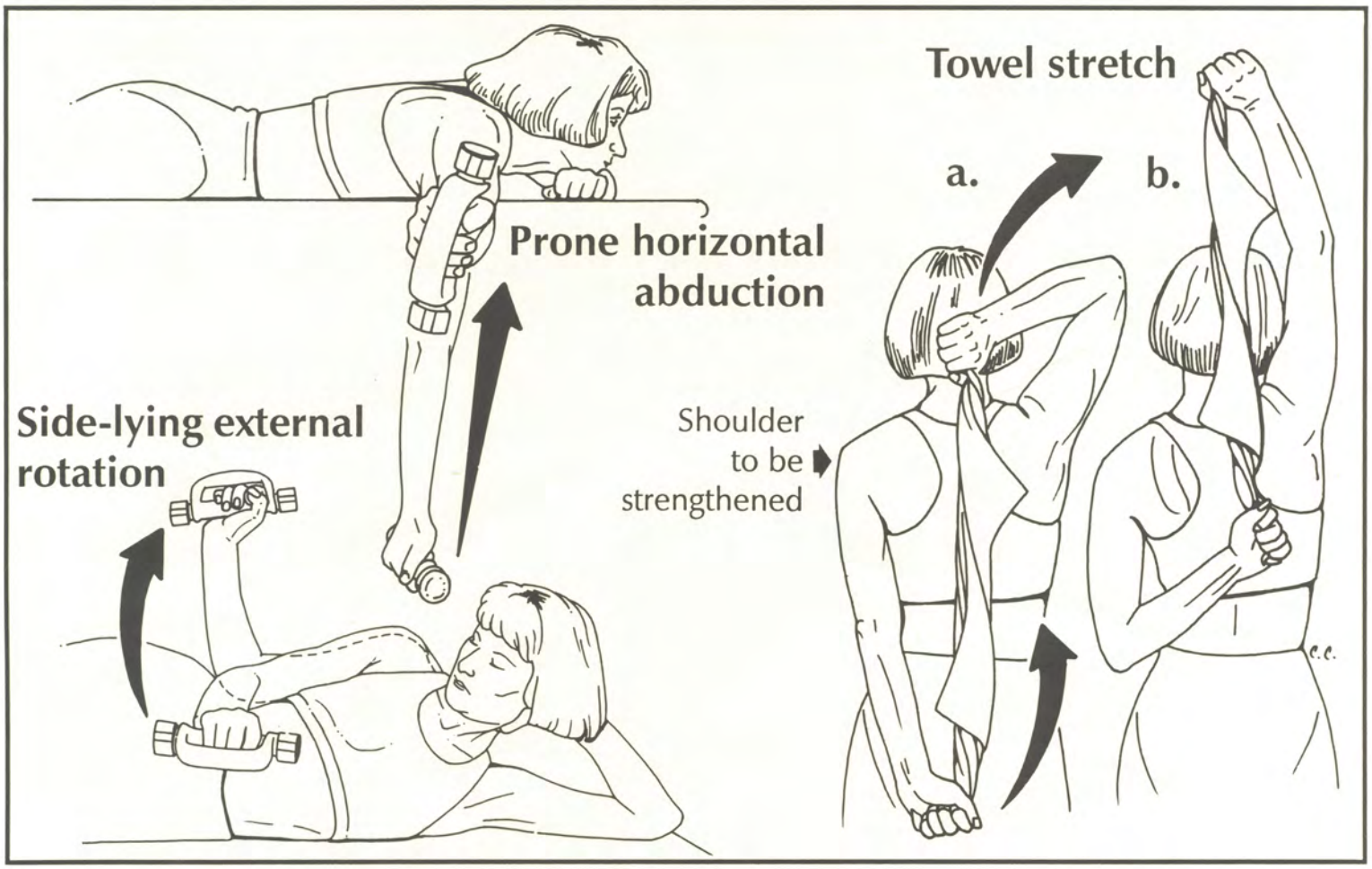

Arthroscopic Subacromial Decompression

Relieving the pressure of shoulder impingement

Arthroscopic subacromial decompression is a surgical technique used to relieve pressure in the shoulder joint caused by swelling or injury, known as shoulder impingement (see Overuse Injuries, p.1). An arthroscope is used to look inside the joint. Arthroscopes are basically small hollow tubes that can be inserted into the joint. Cameras allow the surgeon to see into the joint, and specially designed instruments can be inserted through the tube to remove or repair damaged tissue, such as ligaments or tendons (see illustration). In the case of shoulder impingement, bone spurs and inflamed tissue may be removed and the coracoacromial ligament may be cut to provide more space in the area above the rotator cuff (the muscles that move the shoulder). This technique to relieve shoulder impingement has been used for many years. It has proven to be effective when done through an arthroscope.

During arthroscopic subacromial decompression, the patient is placed under general anesthesia. The operation is usually performed with the patient lying on his or her side with the shoulder to be operated on up in the air. The patient's arm is attached to a holder to keep it immobilized. First, the arthroscope is placed in the shoulder joint to look at the condition of the ball-and-socket and to treat any other injuries or problems. Then the arthroscope is directed up into the bursa (the fluid-filled sac between the rotator cuff tendons and the acromion bone). The swollen bursa is removed by suction instruments or shavers. The thick anterior coracoacromial ligament is often cut with a cautery, a heated blade that is used to control bleeding. A portion of the undersurface of the acromion can be removed as well as any bone spurs that may be projecting out. The procedure can usually be performed in 45 to 90 minutes. Depending on the patient's age and general health, the procedure can be performed on an outpatient basis or may require an overnight stay in the hospital.

The advantage of performing subacromial decompression with an arthroscope, as opposed to open surgery, is the overall comfort to the patient. This includes a shorter hospital stay, less pain, and less scarring. The operation is technically demanding and, therefore, requires a skillful surgeon.

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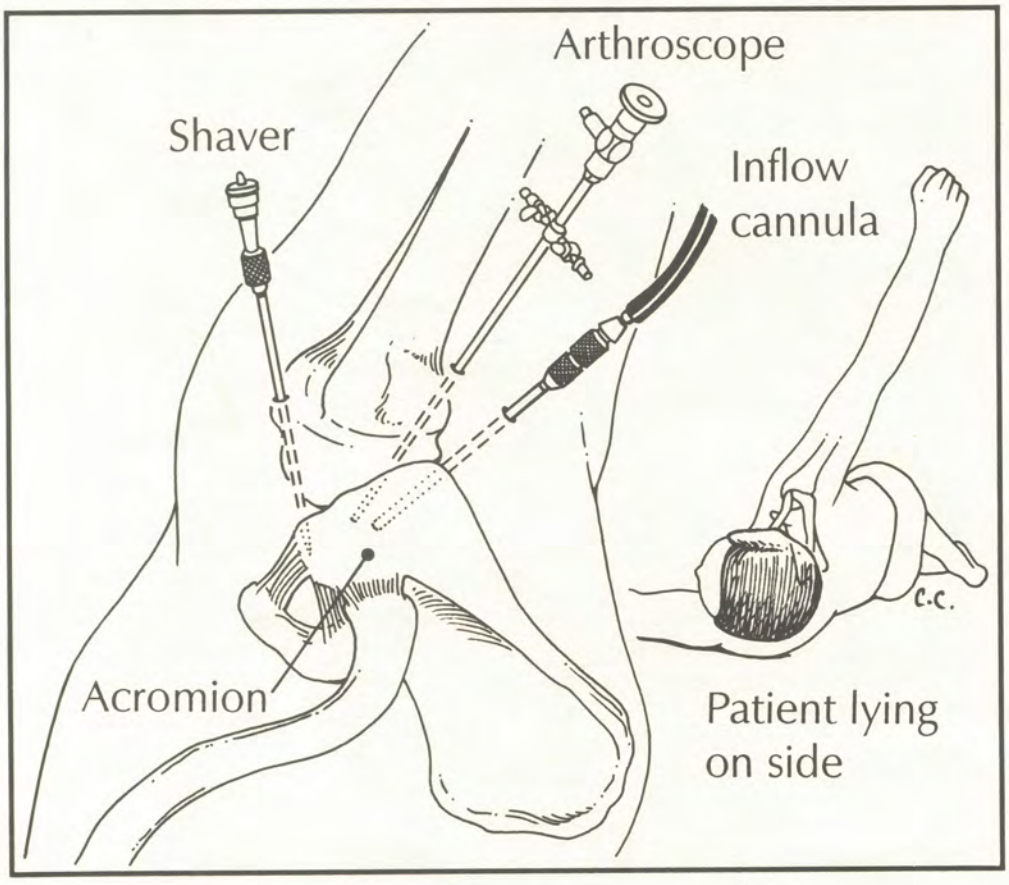

Health Risk Behaviors in Teenagers

Do athletes have healthier lifestyles?

Adolescence is characterized by a period of rapid physical and emotional growth. Teenagers often compare themselves with their friends to decide what is considered normal behavior and, at this age, the peer group often sets the behavioral standards. Many people assume that individuals who participate in sports are healthier and more likely to engage in other behaviors that have a positive effect on their health. Recently, the Hughston Sports Medicine Center conducted a study of high school students to find if this was true.

In early 1992, high school students in the Muscogee County School District were asked questions about a

variety of behaviors known to have a significant effect on adolescent health. The 84-question survey included questions on the use of seat belts, driving over the speed limit, carrying weapons, risk factors for suicide, diet, level of physical activity, sexual attitudes, and the use of drugs, alcohol, and tobacco. The data were analyzed to determine any significant differences in these areas between athletes and nonathletes.

A total of 7179 surveys were analyzed, which accounted for 86% of the school district's enrollment; 49% of the respondents were male and 51% were female. Nearly 60% of students surveyed were classified as athletes because they had participated in organized sports outside of gym class in the past year. The responses of these students were compared with students who had not participated in organized sports in the past year.

Results of the Survey

The athletes surveyed were more likely to exceed the speed limit by more than 10 mph. They tended to use seat belts slightly more often than nonathletes, but they used helmets less often than nonathletes when riding a motorcycle or bicycle.

Nonathletes reported more cigarette use than athletes. This may be because smoking has an immediate effect on the athlete in terms of reduced aerobic power. For nonathletes, it may be decades before they experience the adverse effects of smoking. However, there was no significant difference between athletes and nonathletes in their use of marijuana, cocaine, or other illicit drugs.

The data suggest that athletes have healthier diets than nonathletes. Athletes reported that they ate breakfast and consumed items from the dairy, fruit, and vegetable food groups on a daily basis more often than nonathletes. Athletes also reported adding less salt to their food compared with their nonathletic peers.

Not surprisingly, more athletes were enrolled in gym class and engaged in 30 minutes of non-stop exercise at least 3 times per week.

Conclusions

Because of their behavior, teenage athletes put themselves at significant risk for accidental injuries. However, athletes appear less likely to smoke cigarettes or marijuana, more likely to engage in healthy eating habits, and less likely to feel bored or hopeless, possibly decreasing their risk for suicide.

Our findings suggest that adolescents who participate in organized sports do have healthier lifestyles, especially in terms of nutrition and exercise. By establishing these habits at a young age, they may be increasing their lifespan and improving the quality of their lives.

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EQUIPMENT REVIEW

Pro Caps

The development of protective equipment has made a significant contribution to the prevention of athletic injuries. For example, in the past, protective pads for football players were made only on an individual, "as needed" basis. These pads are now mass produced and readily available to all players.

There have also been many changes in the design and padding of football helmets to help reduce head injuries. One product that recently reached the market is called Pro Cap. The Pro Cap weighs 12 ounces and is made of 1-inch thick polyurethane foam with a slick, waterproof outer surface. It covers the outside of the helmet and attaches with VELCRO. The Pro Cap is available in all colors, and team stripes and decals can be applied. Studies using the National Operating Committee on Standards in Athletic Equipment (NOCSAE) Standard Drop Test showed that the Pro Cap reduced the amount of force from a blow to the head by approximately 30%. While the use of this device may reduce the number and severity of concussions to football players, it also reduces the number of injuries to other players' fingers or elbows from impact on the hard surface of the helmet.

More studies are needed to determine how the use of the Pro Cap affects neck injuries. *Remember, helmets do not protect the neck from injury.* Please read the warning label on your helmet and don't spear (using your head to initiate contact) when you block, tackle, or carry the ball.

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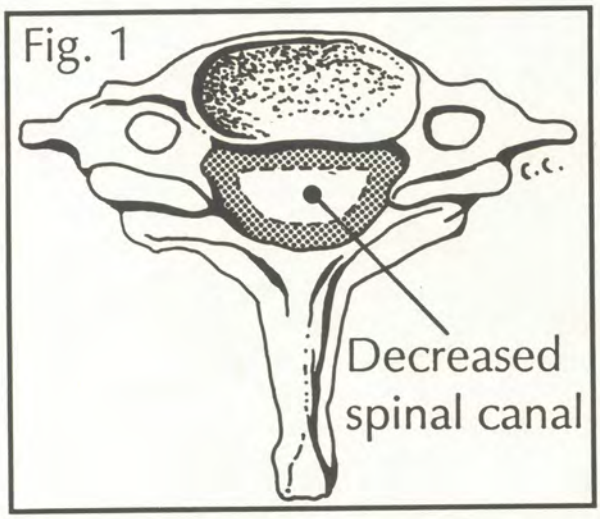
Cervical Stenosis

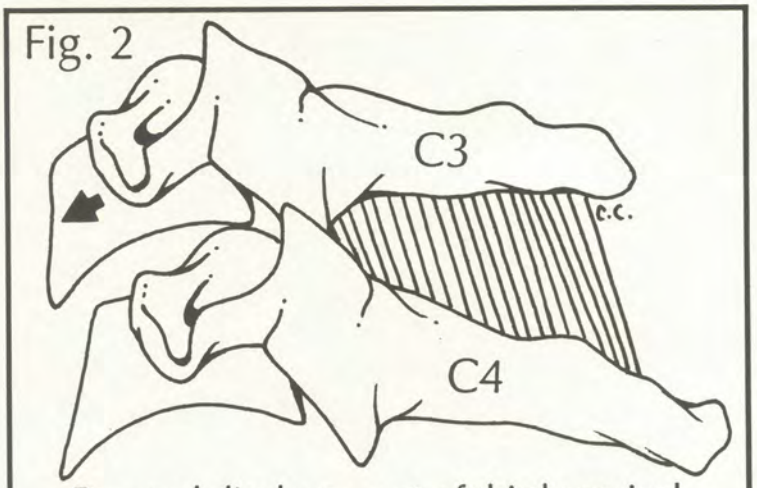
A risk factor for neck injuries in contact sports

When we hear of cases like the college football player, Marc Buoniconti, who was left paralyzed by a neck injury, we realize the serious risks associated with contact sports and the possible life-long consequences of such a neck injury.

The neck acts as a tether that allows the head to move in all directions. The spinal cord runs from the brain down through the cervical spine, the top seven vertebrae which make up the neck. It passes through a canal enclosed by a protective bony and ligamentous framework. Cervical spinal stenosis is a narrowing of the spinal canal in the neck. In young athletes, cervical stenosis is usually the result of congenital malformation (present from birth, not through injury). The malformation decreases the diameter of the spinal canal (see Fig. 1). Other conditions that produce stenosis, particularly in older patients, are degenerative arthritis of the cervical vertebra (spondylosis) and forward displacement of one vertebra over another (spondylolisthesis) (see Fig. 2).



During extremes in neck motion, the abnormally small spinal canal constricts or pinches the spinal cord, leading to nerve problems, such as numbness or tingling in the arm and hand. On rare occasions, the spinal cord is permanently damaged, leading to paralysis of the arms and legs, or quadriplegia.



Forward displacement of third cervical vertebra on fourth cervical vertebra.

People with cervical stenosis are especially at risk for spinal cord injury when their neck is hyperextended and the head is forced backward beyond the normal range. In hyperextension, the ligaments that lie within the cervical canal are loose instead of tight and therefore take up more room in the canal. When the cervical canal is already smaller than it should be, these loose ligaments further reduce the canal space, resulting in pressure on the spinal cord. Hyperextension injuries commonly occur in football during tackling drills. Fortunately, in 1976, the NCAA and the National High School Association established rules that prohibit head-butting and spearing in football to prevent injuries to the cervical spine.

Defining the risk

Cervical stenosis can be present at any one of the seven cervical vertebra. Physicians can diagnose cervical stenosis by measuring the canal's diameter from the appearance of the bony vertebrae on x-rays. But we can now more accurately diagnose cervical stenosis with the aid of magnetic resonance imaging (MRI) or computerized tomography (CT). These imaging techniques allow the radiologist to see muscles and tendons, as well as bones. With these images, the radiologist can visualize and measure the cervical canal and cord.

Presently, an athlete who has cervical stenosis should not participate in collision or contact sports because of the increased risk of quadriplegia. As Duffy Daugherty, Michigan State Football Coach, once said, "Dancing is a contact sport; football is a collision sport."

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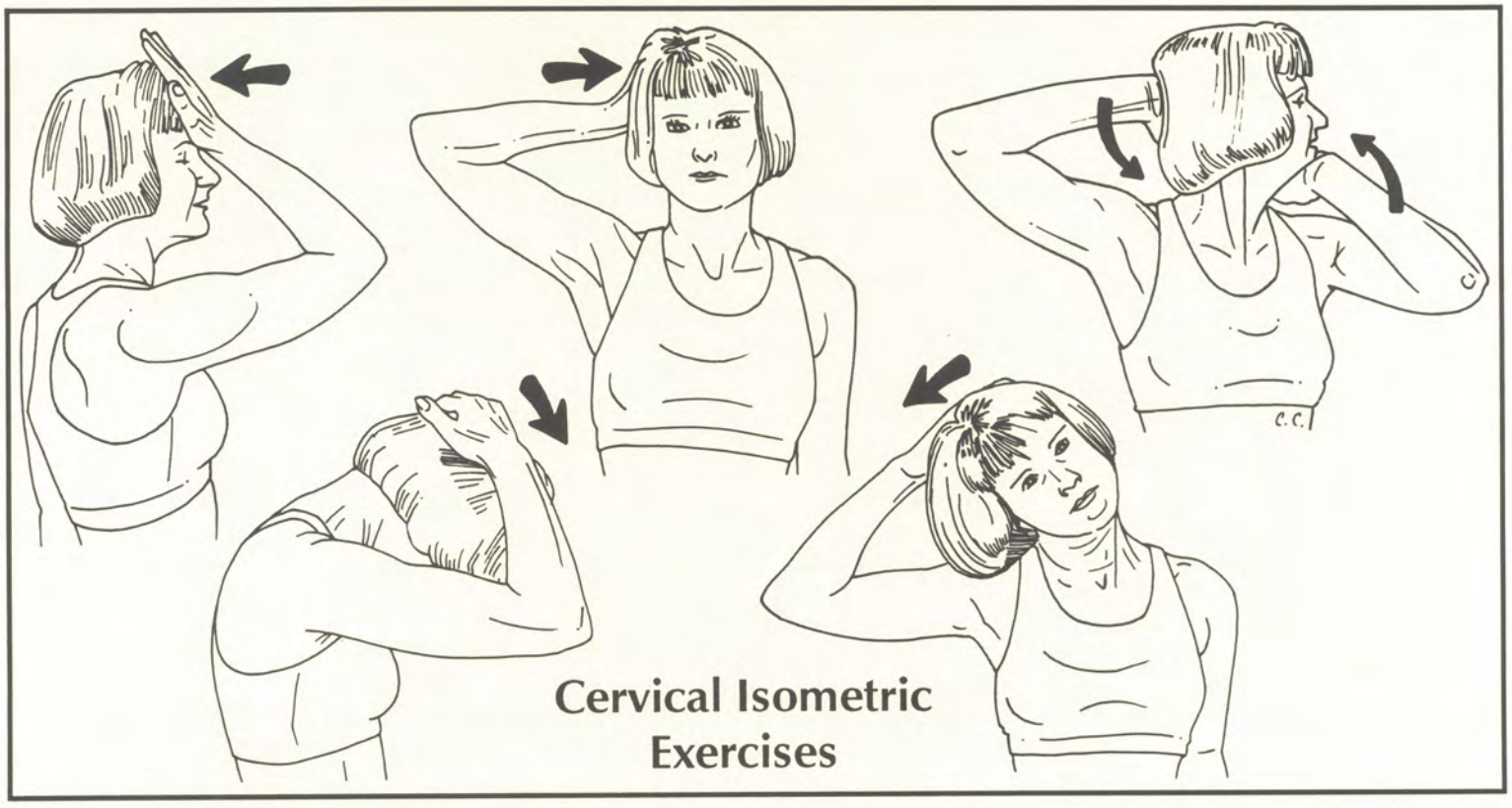
Are You at Risk for Paralysis?

Researchers examined a sample of NFL players and found that 30% of players had narrowing of the cervical canal. Obviously other risk factors must be present to cause a paralyzing neck injury. Current research shows that cervical spine narrowing, lack of flexibility, and tackling headfirst (spearing) all combine to produce these catastrophic injuries.



Cervical Isometric Exercises

Conditioning the Neck and Shoulder

Preparing for contact sports

Hand-eye coordination is important in many sports. It is related to the strength and flexibility of the neck and shoulder joints. The neck and shoulders are also subject to injury during certain sports that involve repeated use and movement of these areas and that expose the player to violent contact with another player. Strengthening the muscles that support these areas can reduce the chance of injury.

The neck and shoulders can be conditioned using a training program that follows the athlete's schedule and season. A basic training program should include the following phases: 1) a preparation phase, 2) a transition phase, and 3) a competition phase.

The preparation phase of training begins with range of motion exercises (flexibility). At this phase, strength training exercises should be done often but at low levels of intensity. Basic strengthening exercises for the shoulder, such as cervical isometrics and shoulder shrugs, should be performed. As the training progresses, the exercises are geared to achieving more strength. Exercises should be done at higher intensity levels but fewer times per day. Cervical weight exercises with a harness or specialized machine and lateral raises can be added at this time.

During the transition phase, the athlete continues to work on increasing his or her strength while adding a power component to the program. This phase should last 2 to 4 weeks. The exercises are done with light intensity and low volume. Some of these exercises include cervical isometrics, bench press, power cleans, and medicine ball throws.

The competition, or maintenance, phase generally reflects in-season training. Volume is low and intensity varies from high to low depending on the game schedule. For example, a training program would consist of 2 to 3 sets and 2 to 3 repetitions (except neck) for 2 to 5 times per week. Exercises in this program include cervical isometrics, weight machine or harness, incline bench, power cleans, and medicine ball throws.

For more information about strength and conditioning, or for help in designing your own conditioning program, you can talk to a physical therapist or athletic trainer. There are also books that can give you an idea of how to design a conditioning program, such as Weight Training: A Scientific Approach by Michael Stone and Harold O'Bryant. The National Strength and Conditioning Association may also be able to recommend a professional in your area or send you literature on conditioning programs. Write to them at P.O. Box 81410, Lincoln, NE, 68501, or phone 402/472-3000.

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Ask the Doctor

Answers to your questions about musculoskeletal health.

Q When might we see artificial replacements for joints other than the hip or knee?

A Most of the joints in our body, outside of the head and spine, have been targeted for joint replacement. Certainly the greatest use and success of artificial joint replacements has been with the hip and knee. The joints of the leg are more likely to wear out because of the weight and stress placed on them. Thus, wear of the shoulder, elbow, wrist, and hand joints is not seen as frequently; however, it does occur. Unlike the artificial hip and knee joints, artificial ankle joints have not been as successful, and further investigation into a more suitable replacement for the ankle continues. Finger and toe joints have been successfully replaced by Silastic implants (a rubbery silicone substance), and a larger version of this type of joint replacement has been used successfully with the wrist. Total shoulder replacement is commonly used in the treatment of certain disorders. Total elbow replacement is not commonly performed; however, it is available.

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H Health Hints

- Your pillow should provide more support to your neck than your head. If you use a regular pillow, it should be made of feathers or fibers, not foam rubber. Foam rubber does not mold to the shape of your neck, it bounces back.
- Proper sitting posture is one of the best things you can do to prevent back and neck problems.

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