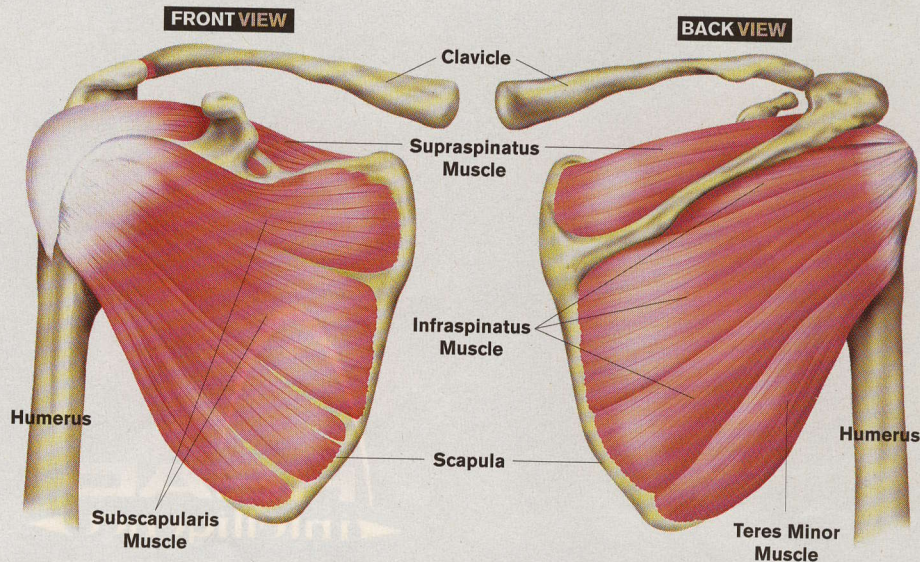


# THE UNKNOWN SHOULDER

THE SHOULDER IS A COMPLICATED JOINT. HERE'S WHAT YOU NEED TO KNOW TO KEEP IT READY FOR THE TENNIS COURT. BY DANA SULLIVAN

IT'S AN EXTRAORDINARY EXAMPLE of engineering, the shoulder. It's the only joint in the human body that can move in virtually any direction: forward, backward, up, down, out to the sides, and rotate a full 360 degrees.

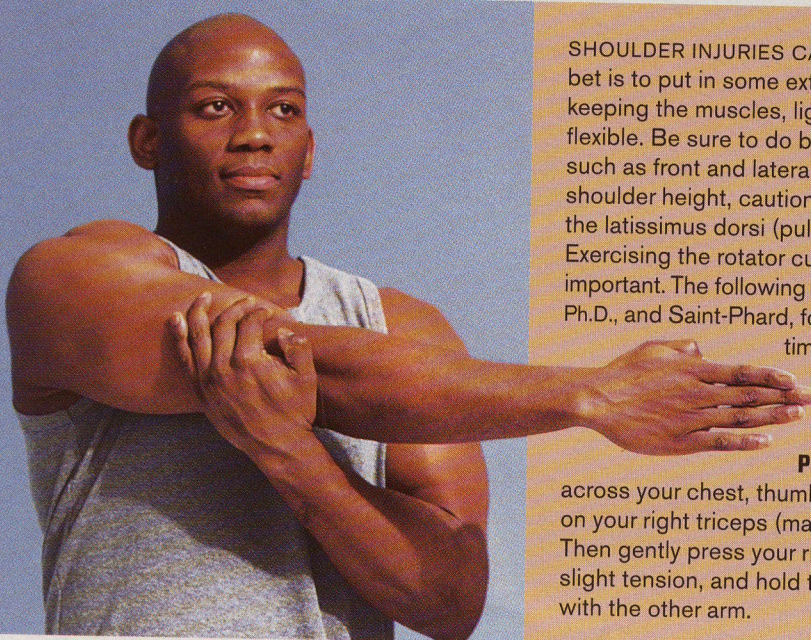
But this mobility comes with a price. The shoulder is runner-up in the "body part most likely to be injured in sports" contest (losing out only to the knee). Each year, approximately 6 million people visit doctors for shoulder sprains, strains, dislocations, and other injuries, according to



the American Academy of Orthopedic Surgeons. Many of those injuries are sports related, with the highest percentage from tennis, swimming, baseball pitching, and weightlifting. Witness the ongoing saga of Patrick Rafter and his

rotator cuff, which is continually strained by his extreme kick-serve motion.

"Picture a golf ball resting on a tee and you start to understand the fragility of the joint," says Stephen Rice, M.D., Ph.D., director of the Jersey Shore



SHOULDER INJURIES CAN BE DIFFICULT TO REHABILITATE, SO YOUR BEST bet is to put in some extra effort to avoid them. Maintain shoulder health by keeping the muscles, ligaments, and tendons that operate them strong and flexible. Be sure to do basic strengthening exercises for your shoulder area, such as front and lateral raises for the deltoids (never lift the weight above shoulder height, cautions Deborah Saint-Phard, M.D.) and pull-downs for the latissimus dorsi (pull the bar down in front of your head, not behind it). Exercising the rotator cuff, which is particularly vulnerable to injury, is also important. The following five exercises, recommended by Stephen Rice, M.D., Ph.D., and Saint-Phard, focus on the rotator cuff and should be done three times a week, working up to two sets of 10 repetitions each. If any of these exercises causes pain, stop immediately and consult your physician.

**POSTERIOR CAPSULE STRETCH** Bring your right arm across your chest, thumb facing up, arm straight. Place your left hand on your right triceps (make sure your hand is above the right elbow). Then gently press your right arm into your body, stop when you feel a slight tension, and hold that position for 30 to 60 seconds. Repeat with the other arm.

ILLUSTRATION BY TREVOR JOHNSTON; ALL PHOTOGRAPHS BY PETER LAMASTRO



**TOUCH-DOWN STRETCH** Stand in the corner of a room with your nose facing directly into the corner. Lift your arms so that your elbows are about shoulder-height, bend at the elbows, and place your hands against the walls, with your fingertips facing into the corner. Now lean into wall, stopping when you feel tension. Hold for 15 to 30 seconds.

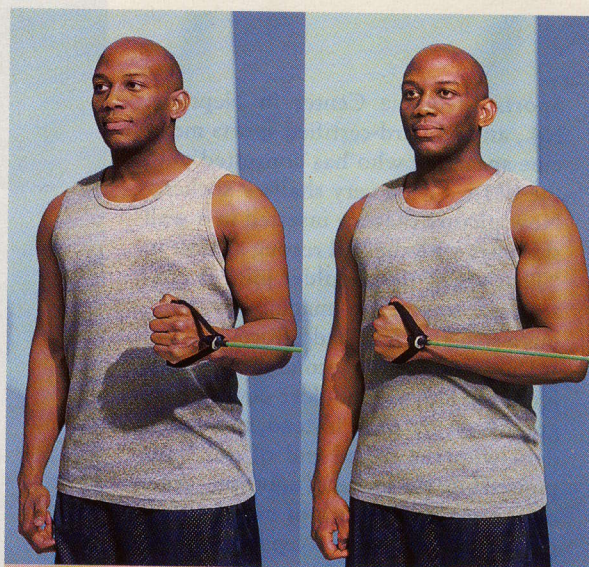


player's shoulder, says Mike Nishihara, C.S.C.S., M.S., director of fitness and sports conditioning at Saddlebrook Resort in Tampa, Fla. "It's a violent action, and if your rotator cuff muscles aren't strong and flexible, then they won't be able to stabilize the arm and effectively slow the movement down," he says.

Stretching and strengthening your rotator cuff and shoulder muscles will help prevent common shoulder injuries (see exercises illustrated in this story). But if your shoulders do bother you, try a couple of lessons that focus on getting your serve and overhead working as efficiently as possible. "A simple tweak in your overhead motion may help," says Nishihara. He also has his clients loosen up their arms by throwing a baseball or football a couple of times a week. Gently toss the baseball up, like a pop fly, and throw easy passes with a Nerf ball. "It makes you work your shoulder muscles in a slightly different way than you do in tennis," he says.

Before working out, though, tennis players need to pay attention on the court. "When your percentage of first

*Dana Sullivan also writes frequently for "Sports Illustrated for Women."*



**ROTATOR CUFF BAND-STRENGTHENERS** Attach a piece of rubber exercise tubing to a door knob (be sure the door is closed). Stand sideways to the door; keeping your elbow tucked next to your body, pull the band toward your navel. Slowly return to the start position (don't let the band snap back). Do 10 repetitions. Now turn around so the door is on your other side, but the tube is still in your dominant hand. Starting with your arm across your waist (hand at navel), pull the band out and away from the body, pivoting again from the elbow. Do 10 repetitions, switch arms, and repeat.

serves drops or you're getting tired and sloppy, it's time to stop," says Rice. Baseball coaches count the number of pitches a pitcher throws during a game, he notes. They know that when velocity and accuracy go down, it's time to give the shoulder a rest and put in a reliever. And while you obviously can't call in a replacement to finish your match, your shoulder will appreciate you calling it a day. ●

**VITAL SIGNS** Unless you want to start serving underhand, your shoulder is going to be at risk when you play tennis. Some clear signals that you should see a physician immediately: (1) Your shoulder is stiff and you can't rotate your arm normally; (2) your shoulder feels like it could "pop" or "slide" out of its socket; (3) you lack the strength in your shoulder to carry out normal activities. Below are other symptoms that may indicate a shoulder injury:

SYMPTOM	COULD BE	TREATMENT
Pain and weakness, especially when the arm is extended and raised and lowered; swelling and tenderness.	<b>Tendinitis</b>	Ice, three times a day for 20 to 30 minutes at a time; for pain, take acetaminophen; for pain and swelling, try ibuprofen.
Gradual onset of pain in front and upper shoulder; pain when raising and lowering arm; loss of motion; swelling and tenderness.	<b>Bursitis</b>	Stop playing tennis, but don't keep your arm entirely motionless; ice for 20 to 30 minutes at a time, at least three times a day; for pain, take acetaminophen; for pain and swelling, try ibuprofen.
The feeling that your arm has "slipped" out of its socket; your arm hangs limply at your side; extreme, sudden pain, and muscle spasms.	<b>Dislocation</b>	See a physician as soon as possible so that the joint can be realigned. Apply ice for 20 minutes at a time until medical assistance arrives.
The inability to raise your arm to the side.	<b>Torn rotator cuff</b>	Check with your physician.



Sports Medicine Center in Neptune, N.J., and a board-certified sports medicine specialist who has consulted with the USTA. "It's a very shallow socket." Now picture that tee inserted in a wall sideways with the ball resting against it. "That's how the shoulder joint is constructed, so you can imagine how tenuous a structure it is," adds Rice.

Unlike the body's second-most mobile joint, the hip, the shoulder doesn't have gravity on its side. Instead, the shoulder—with the round end of one bone pressed into the socket of another—relies on a complex network of muscles, tendons, and ligaments to keep it stable and facilitate its broad range of motion. "These soft tissues are the main things keeping your arm in place after a really powerful serve," notes Rice. The momentum generated from a serve isn't what these tissues were designed to handle.

To understand what makes the shoulder so mobile yet so vulnerable, you also have to understand its construction. For all its elegance, the shoulder is actually a complicated structure made up of three bones—the scapula (shoulder blade), humerus (upper arm), and clavicle (collarbone)—four muscles—the supraspinatus, infraspinatus, teres minor, and subscapularis—and the tendons that keep these four muscles attached to the bones, a network known as the rotator cuff.

Most shoulder injuries involve the surrounding soft tissues—the tendons, ligaments and muscles—rather than the bones. "The injuries are usually an issue of balance," says Deborah Saint-Phard, M.D., assistant attending physiatrist at the Women's Sports Medicine Center at the Hospital for Special Surgery in New York.

"Most competitive tennis players tend

**PENDULUMS** With your feet shoulder-width apart, bend at the waist and dangle your arm before you, resting your left hand on your hip or on a table for balance. Allow your right arm to swing back and forth, passing your palm directly in front of your kneecaps. Do 20 reps. Then change your arm's direction 90 degrees, so it swings toward and away from your body, between your legs. Repeat 20 times. Now make large, circular motions, 20 clockwise and 20 counterclockwise. Repeat with your left arm.

joint," she adds. "Most people are strong and tight in the front of their shoulders [the pectoralis major muscles] and weaker and looser in the back shoulder [the trapezius, rhomboids, and latissimus dorsi muscles]." This muscular imbalance

serving can cause a repeated pinching of the rotator cuff tendons (though it can also be caused by trauma or age), possibly causing tendinitis (inflammation in the tendons) and/or bursitis (irritation and swelling in the bursae between the rotator-cuff tendons and other ligaments and bones).

When the muscles and connective tissues aren't well-conditioned and there's too much "play" in the shoulder, it can feel like your shoulder is sliding in and out of position. "Then there's the potential for injury to the ligaments, cartilage, and bone," says Saint-Phard. "Your shoulders should move seamlessly."

It's the throwing motion, the one you need to serve and to hit an overhead, that's particularly damaging to a tennis

## A REPETITIVE OVERHEAD MOTION LIKE SERVING CAN LEAD TO A REPEATED PINCHING OF THE ROTATOR CUFF TENDONS, POSSIBLY CAUSING TENDINITIS OR BURSITIS.

to have greater external rotation [they can raise the arm out to the side and turn the elbow up and out] than internal rotation [the ability to hold the arm out and turn the elbow in and down]. This can create abnormal forces on the shoulder

ance can contribute to overuse injuries such as "impingement" syndromes, which can lead to tendinitis and bursitis.

Impingement syndromes are one of the main causes of shoulder pain in athletes. A repetitive overhead motion like

