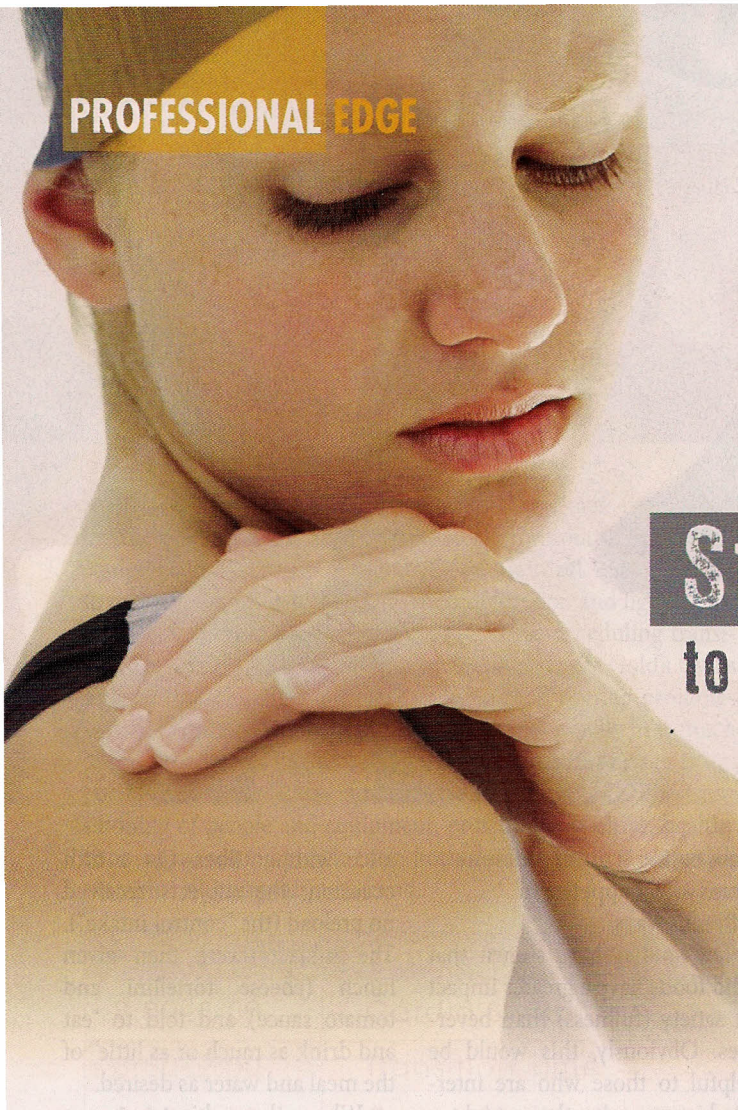


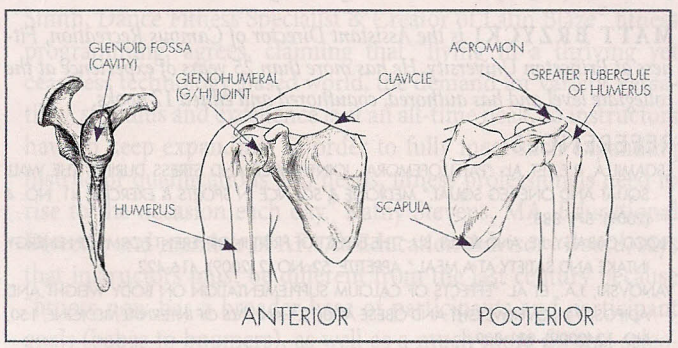
# Strength Training to Prevent Shoulder Injuries

## Strengthen, stretch and stabilize for a strong foundation

BY ANGIE MILLER, MS

Have you ever had a "chip on your shoulder" when something didn't go your way, or offered a friend a "shoulder to cry on" during a difficult time? Possibly in a weak moment you've given someone the "cold shoulder." Trite as they may be, these clichés lend significance to the function and strength of our shoulders. Not so cliché is the importance of our shoulders to everyday movement and activity.

The shoulder is the most mobile joint in the human body. By virtue of its design, it allows significant range of motion and the ability to move in a variety of directions. It enables us to perform everything from heavy work to simple tasks. But despite how much we depend on it, the shoulder is a fairly unstable joint. This combined with its significant range of motion is actually its Achilles' heel. As fitness professionals we need to be aware of what we can do to make the shoulder stronger and how we can keep it stable and injury free.




### The Structure of the Shoulder

In order to better understand the dynamics of the shoulder, it's important to understand its structure. The shoulder joint is composed of three bones: the clavicle (collarbone), scapula (shoulder blade) and the humerus (upper arm bone). Two joints allow shoulder movement: the acromioclavicular (AC) joint and the glenohumeral joint.

The glenohumeral joint is commonly referred to as the shoulder joint. It is a ball-and-socket joint that gives the shoulder range of motion and the ability to move in a variety of directions. The top rounded portion of the upper arm bone, or humerus, is the "ball," and the flat, dish-shaped part of the scapula that the ball fits into is the glenoid, or "socket."

The rotator cuff is compromised of four muscles that work together to help stabilize the shoulder joint during movement. The four muscles of the rotator cuff are the supraspinatus, infraspinatus, teres minor and subscapularis, often referred to as S.I.T.S. The supraspinatus abducts the shoulder, the infraspinatus and teres minor externally rotate the shoulder, and the subscapularis internally rotates the shoulder and draws the humerus downward.[2] Though they each have separate functions, according to Kathy Wojtun, CSCS, a Physical Therapist at West Physical Therapy in Geneva, Ill., "All four muscles of the rotator cuff work together to stabilize the shoulder joint, depress the head of the humerus in the glenohumeral joint, and put it in a good mechanical position for movement."

## The Shoulder Socket

When Dr. Vishal Mehta, MD, Sports Medicine Surgeon for Fox Valley Orthopedics in Illinois, describes the shoulder socket, he compares it to a "golf ball on a tee." Just as a golf ball is bigger than the tee on which it sits, the ball of the shoulder is bigger than the socket in which it is held. The ball sits on a flat dish, which means it is not constrained by the bone. The soft tissue, muscles, tendons and ligaments surrounding the shoulder hold the shoulder in place and keep it stable. Compared to the hip joint, where the ball sits deep into a socket, the shoulder socket is very shallow and not nearly as protected. This, combined with its extensive range of motion and lack of stability make it much more prone to injury.

## Common Shoulder Injuries

Wotjun finds that most shoulder injuries result from degeneration, general wear and tear over time, or from some type of trauma or excessive force to the shoulder. She commonly treats patients with shoulder injuries resulting from impingement syndrome. In a person with impingement syndrome, the space between the head of the humerus and the acromion, (a bony extension of the scapula), isn't adequate and doesn't allow the smooth gliding movements of the rotator cuff. When the arm is raised, the rotator cuff becomes pinched between the two bones. Wojtun believes impingement syndrome is often the result of abnormal mechanics, postural deficits or muscle imbalances that affect the mechanics of the shoulder joint, thus weakening the rotator cuff and causing inflammation. Impingement syndrome can also be caused by accident or injury, and commonly occurs with age. As people grow older their shoulder muscles and tendons weaken and their shoulder becomes less stable. According to Mehta, "Shoulder impingement normally causes pain over the front and side of the shoulder during elevation. It can often progress to a constant, achy pain that radiates down the arm to the deltoid insertion. It also commonly aches at night, making it difficult to sleep."

Wotjun also treats patients with frozen shoulder, or adhesive capsulitis, which occurs when the shoulder becomes inflamed and stiff, causing restricted motion and chronic pain. Frozen shoulder is often linked with underlying health conditions such as diabetes, stroke and thyroid conditions, and is sometimes caused by trauma to the arm.

Mehta also treats patients with impingement syndrome, as well as rotator cuff tears. Rotator cuff tears can be chronic or acute. Acute tears often occur as a result of a traumatic injury, such as a slip or fall, and can result in pain, weakness, decreased range of motion, and muscle spasms. They are more common with athletes. Chronic tears, according to Wotjun, are often associated with wear and tear over time, and can be caused by degeneration of the supraspinatus tendon due to prolonged inflammatory conditions such as arthritis of the shoulder.

Dr. Yuanhui (Kyle) Zhang, MD, Physical Medicine and Rehab Specialist, agrees that shoulder injuries often stem from wear and tear over time, along with lack of flexibility and reduced range of motion. He states that rotator cuff injuries are common, especially in older patients. In younger patients, especially younger athletes, he finds that shoulder instability and dislocation are more common. Instability may be caused by overstretched ligaments, such as what a baseball pitcher might experience, or from dislocation after some sort of trauma, where ligaments often get torn.

## Strengthening the Shoulder

According to Zhang, "Our shoulder is a very free moving joint and we need to work multiple muscles to keep it in place." Wojtun couldn't agree more. She states that it's critical to do strength training exercises for the rotator cuff and the smaller scapular stabilizing muscles, including the middle and lower traps, rhomboids and serratus anterior, in order to prevent injury. These muscles are sometimes referred to as the "non-mirror muscles," and are frequently neglected. Wojtun believes that it's important to strengthen the more prominent muscles as well, sometimes referred to as the "mirror muscles." These muscles are more visible externally and are associated with more traditional training methods. They include the anterior deltoids, pectorals and biceps.

The key is to create balance when we train the upper body, but all three experts agree that it's important not to neglect the rotator cuff and smaller scapular stabilizing muscles. If we do this we are more prone to injury, poor upper body posture and muscle imbalances. Often such training leads to a rounded shoulder posture and incorrectly places the scapula up and forward, which compromises its integrity.

As Mehta describes it, "It's like building a house. You have to have a nice strong foundation before you work on the exterior." Therefore you have to train the rotator cuff and the smaller scapular stabilizers to create a solid foundation and master accurate technique before you can move on to train the larger muscles.

Some recommended methods of strengthening the muscles of the shoulder are internal and external rotation exercises using cables, resistance tubing or even dumbbells. Rowing, scapular depression, push-ups and shoulder extension exercises are also recommended.

## Stretching the Shoulder

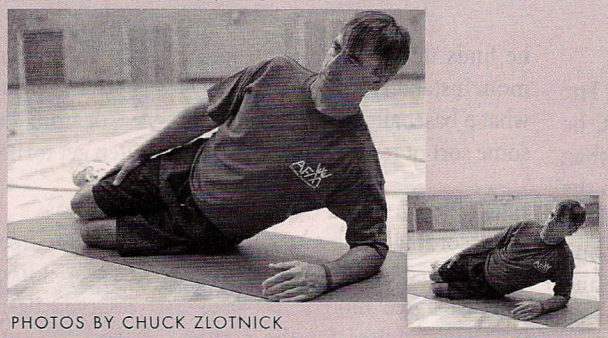
Mehta, Wojtun and Zhang all address the need for flexibility of the shoulder and its surrounding muscles in order to improve posture and circulation, increase range of motion, and prevent injury. They agree that it is necessary not just to strengthen, but to stretch the surrounding muscles in order to achieve balance. The rotator cuff can be particularly prone to injury if it is tight or has decreased range of motion.

One effective stretch that Wojtun recommends is the doorway stretch: Stand in an open doorway, putting hands on either side of the wall in a high "V" position, then step forward to stretch the pectorals.

Another stretch is to bring one arm across the body and hold it with the other arm, either above or below the elbow, to stretch the back of the shoulder joint.

A third stretch is a sideways "wall walk." This involves walking the fingers up the wall to stretch the biceps and the underside of the shoulder. It is helpful in maintaining good extensibility of the ligaments that support the shoulder.

### Side-Lying Propping



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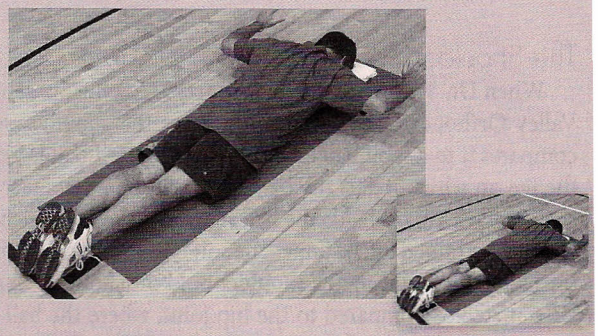
### Frontal Dorsal Lift

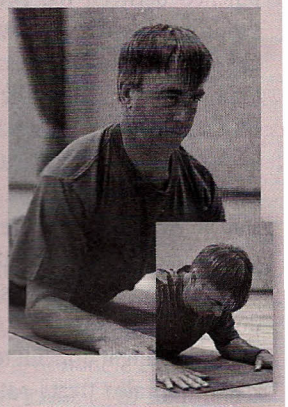


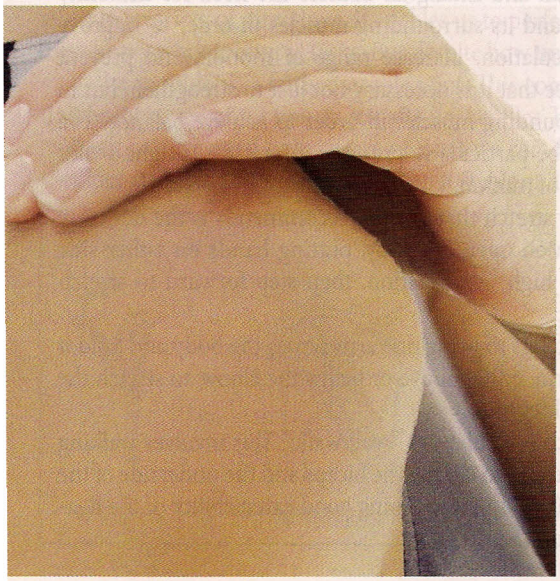
- Avoid behind-the-neck lat pull-downs and military (overhead) presses.
- Avoid excessive range of motion in bench presses, flys and pec decs.
- Minimize time spent in the "red zone."
- Keep upright rows and lateral raises to 90 degrees or less of shoulder abduction.
- Provide scapular retraction exercises. These include: reverse flys and high rows (bent-over, on a bench, or on a stability ball), standing high rows from a mid-pulley, seated high rows with tubing, and prone dorsal lifts.
- Provide stretches for the scapular elevators (upper traps) and the anterior chest muscles. These include: cervical lateral flexion and cervical spinal flexion for the upper traps, and horizontal shoulder abduction for the chest muscles.
- Provide external rotator cuff exercises for healthy shoulder joint functioning. These can include standing external rotation with a tube or band, or side-lying external rotation with a dumbbell.
- Provide scapular depression exercises. These include: depression dips off a bench, bar or stability ball, and depression while holding a bar attached to a high pulley (keep elbow and shoulder joints still, moving only the scapulae).
- Provide stability exercises for both the shoulder girdle and the shoulder joint. These include: prone arm prop with scapular depression, front, side and reverse planks, and side-lying elbow propping. Encourage scapular depression as well as humeral head depression.

Source: Mechanics of Injury Prevention, Aerobics and Fitness Association (2008).

### Cervical Spinal Flexion

### Scapular Depression





## Caring for the Shoulder

Despite its ability to move in all directions and achieve significant range of motion, the shoulder is not to be taken for granted. Its significance to everyday life and activity cannot be emphasized enough, thus experts agree that as fitness professionals we need to be aware of how we can strengthen, stretch and stabilize this area in order to prevent injury. **AF**

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