

Shoulder Series #3

Subscapularis

Tendinitis

By Ben Benjamin

In previous articles I discussed what I call the Essential Principles regarding the nature of injury and the healing process. These principles are especially helpful in recognizing and treating those difficult-to-identify, elusive pains that plague clients.

Parts 1 and 2 of this series on the shoulder differentiated two specific “rotator cuff” injuries — infraspinatus tendinitis and supraspinatus tendinitis — and discussed effective treatment regimens appropriate for each injury. (See the June/July 2004 and August/September 2004 issues of *Massage & Bodywork*.)

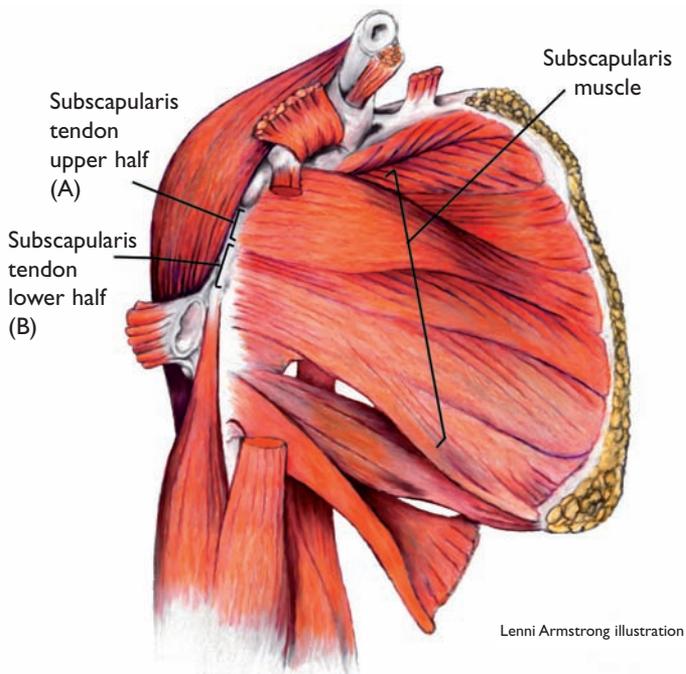
This article, the third and final part of the trilogy, applies the Essential Principles to another common, and commonly misidentified, shoulder or rotator cuff injury: subscapularis tendinitis.

The Nature of Injury at the Subscapularis Muscle

The subscapularis muscle is attached to the undersurface of the scapula, sandwiched between the shoulder blade and the ribs. Its tendon attaches to the humerus on the lesser tubercle. The subscapularis muscle-tendon unit is difficult to visualize because the tendon goes through the body from back to front. This muscle helps you open jars, hug someone, lift things, clap your hands, throw a ball, and complete the forehand and serving actions in tennis.

The subscapularis is by far the strongest of the four rotator cuff muscles. If a client has a shoulder injury, there is a 70 percent to 85 percent chance it is the subscapularis tendon. In people under age 40, it is the most frequently injured structure in the shoulder. Yet subscapularis tendinitis is the shoulder injury most likely to be missed by the healthcare professional. Before I understood how to assess this problem, it was the most perplexing shoulder injury imaginable. One likely reason for this confusion is that the subscapularis is such a strong muscle that, unless it is severely injured, it does not test positively during the most commonly used test to locate this injury. Once I learned some auxiliary testing positions to avoid this difficulty, I was able to accurately assess this injury.

When the subscapularis tendon (A and B, above right) is injured, some of its fibers are strained and torn; this lesion usually occurs at the tenoperiosteal junction (the point of attachment from tendon to bone). Fibers in the muscle belly will rarely tear. Subscapularis tendinitis can occur in an instant if a strenuous action is performed before the muscle is warmed up and ready. With a good warm-up, the muscle-tendon unit is more pliable and can absorb stress more easily. Overdoing an activity after a period of inactivity makes a person vulnerable to this injury. Lifting something heavy, throwing a stone into the middle of the lake with all of your strength, or simply



reaching into the back of the car to lift a heavy bag and pull it toward you — any one of these can cause a subscapularis injury.

Pain as a Signal

Subscapularis injury can make its appearance slowly over time or in an instant if there is an overt accident. When it appears slowly, a person finds that lifting the arm up high or putting on a shirt hurts. Or, after playing tennis for a while, serving brings on pain in the shoulder or down the back of the upper arm. If the injury becomes really severe, even opening a jar or door will be painful. Throwing a ball can also bring on this injury, as this is the main muscle used in pitching — both overhand and sidearm. Many pitchers suffer from this injury. Overuse is a major factor, and it is often difficult to know the exact cause, because the pain is often not felt until several days after the strain occurs.

Pain from this injury can be felt anywhere in the upper arm area and is often not felt where the tendon attachment is located. Pain can be referred down as far as the wrist if the strain is severe. Even though the tenoperiosteal junction is the site of most subscapularis injuries, the pain is generally felt in the back of the upper arm in the area of the triceps muscle. When the tear is in the muscle, which is rare, pain is felt under the shoulder blade.

Scar Tissue and Chronic Pain

This injury may become chronic, coming and going with the amount of exertion performed. Each new

exertion creates a small tear that heals with adherent scar tissue. The scar tissue tears again with each new stressful activity. This cycle can occur hundreds of times in a few months, creating a matted scar that is painful and weak. After a while, the muscle works inefficiently and becomes weak. This injury may go unnoticed because overall the subscapularis muscle is quite strong.

This injury frequently accompanies a dislocated shoulder and is often the cause of chronic pain for months after the dislocation has occurred. When dislocation occurs, the subscapularis and/or the infraspinatus tendons are over-stretched and torn, causing inflammation and pain, further weakening the tendon(s) and encouraging more frequent dislocations.

Injury Verification

The precise differentiation of the various rotator cuff injuries is very important if treatment is to be administered effectively. The often-used term “rotator cuff injury” is not that helpful in pinning down the exact location of the injury so that treatment can be applied to the affected fibers. In this article, I will detail the precise differentiation of subscapularis injury.

While performing your assessment tests, try to ignore exactly where the client feels pain, as long as it is felt in the upper arm and shoulder. While testing for this injury, the client will often feel pain in strange places, like down the back of the upper arm, within the arm, at the back of the deltoid muscle, or occasionally far under the scapula. The subscapularis tendon has a broad and flat tendon attachment about an inch in width. It is usually injured in one of two places at the tenoperiosteal junction — either at the upper half or at the lower half of the tendon (A or B, page 99).

The most important positive test for this injury is pain felt on resisted medial rotation (Test 1 above, right). This test is called the “major indicator” because it gives you the most important information you are seeking. The passive tests that follow are called “auxiliary indicators” because they give you additional information that helps you locate exactly where on the tendon the injury has occurred. If the upper half of the tendon is injured, then there will also be pain on an additional test — passive elevation of the arm (Test 2, page 104). This test compresses the upper half of the tendon between the head of the humerus and the acromion. If there is pain on passive horizontal adduction of the arm (Test 3, page 104), then the tendon is injured in the lower portion. This test compresses the lower half of the tendon between the head of the humerus and the coracoid process. If both of these passive motions cause pain, then both halves of the tendon are injured. Remember, the primary test for this injury is resisted medial rotation (Test 1 above, right). The secondary or auxiliary tests, Nos. 2 and 3, are passively done by the therapist and indicate precisely what part of the tendon is injured.



Test 1 — Major indicator

Test 1 — Resisted Medial Rotation

To efficiently test for subscapularis tendinitis, the client's upper arm must be fixed into her body. To stabilize the upper arm into the body, place one hand on the upper arm just above the elbow and press the upper arm into the body. With her arm bent in front at a right angle, place your other hand on the inside of the client's wrist. Now, ask the client to pull the wrist toward her stomach while you pull outward with equal force, maintaining the 90 degree angle to the abdomen. Be sure to keep the upper arm into the body to stabilize the shoulder or the test will not read correctly. If this test causes no pain, begin the test from a stretched position by laterally rotating the arm to 135 degrees (Test 1A) and then to 180 degrees (Test 1B). →



Test 1A — Auxiliary indicator, 135 degrees



Test 1B — Auxiliary indicator, 180 degrees

From this new starting position, have the client pull toward the abdomen. Each test variation stretches the muscle a little bit and progressively puts more stress on the tendon. This principle is important to keep in mind while testing all tendon injuries.

Test 2 — Passive Elevation

First, say to the client, “Raise your arm above your head.” You ask the client to do this by herself so you can get an idea of the extent of the injury. If the client has great difficulty in lifting the arm, you will know to go very gently as you perform the next test. Now place one hand on the elbow and your other hand at the back of the same shoulder to stabilize the joint (see Test 2).



Test 2 — Passive elevation

Push the arm back diagonally until you come to the very end point of the range of movement. If there is still no pain felt, give the arm a slight jerk in the same direction. This jerk places extra stress on the injured structure and is always done at the very end of the range of motion. The client should be totally relaxed while you passively test the arm.

Test 3 — Horizontal Passive Adduction

Standing at either side of the client, place one hand on her elbow and lift the arm so it crosses in front of the client's body. Now place your other hand on the client's shoulder blade opposing it (see Tests 3 and 3A). For instance, if your right hand is on the client's right elbow, place your left hand on her left shoulder blade. Your hands should now be parallel to one another. Squeeze both of your hands together to compress the tendon.



Test 3 — View from the front



Test 3A — View from back

This test compresses the lower part of the subscapularis tendon against the coracoid process.

Healing Injured Tissues

If the subscapularis strain is mild, a week or two of rest will often eliminate this injury. Unfortunately, most shoulder injuries undergo repeated tearing and poor scar tissue formation, so treatment is needed.

Traditional massage therapy alone is not usually an effective treatment for subscapularis tendon injuries. There is often very stubborn scar tissue that needs to be eliminated. However, massage is useful as an adjunct to friction and exercise therapy.

Friction therapy, or transverse friction massage, is a very precise form of massage developed by Dr. James Cyriax. It is remarkably effective in treating most muscle, tendon, and ligament injuries. It is ineffective, however, when the structure lies deep within the body and cannot be easily reached with the finger.

Friction therapy is done with no oils or creams. One or several fingers are placed on the skin at the exact point of injury. Pressure is applied in one or two directions while a constant back-and-forth action across the painful structure is maintained for anywhere from five to 15 minutes. This approach is somewhat uncomfortable at first, but the discomfort diminishes steadily as the treatment progresses.

Friction therapy works by breaking down scar tissue that prevents proper healing within muscles, tendons, and ligaments. It also separates ligament-to-bone adhesions and allows normal healing to occur. Friction therapy also increases blood circulation to areas that normally have very little blood supply. It accomplishes this through mild, controlled trauma to the tendons and ligaments. I usually suggest that frictioning be done in one direction only so both the client and the practitioner can rest momentarily between each stroke.

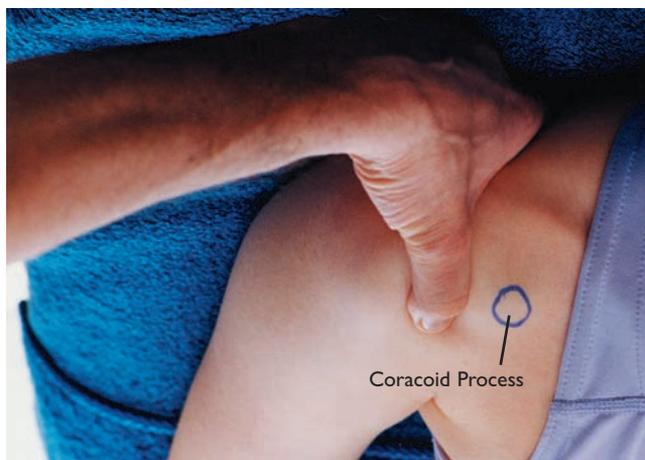
The treatment is mildly uncomfortable, but not painful if done properly. With a relatively fresh injury, treatment of subscapularis tendinitis usually shows signs of progress in three to four weeks. For more long-standing cases, treatment may last two to three months. Treatment should be administered twice a week and should be performed in conjunction with massage therapy and a prescribed exercise program.

Begin the treatment with 10 to 12 minutes of friction as described below, giving the client and your finger a brief rest after about five or six minutes. Make sure the client doesn't experience too much discomfort while you're performing friction therapy. In some individuals this tendon can be very tender. Start with very light pressure and slowly increase the force as the tendon becomes hyperemic and slightly numb. Always observe the client's facial expression in addition to what she may say. Start as gently as you need to — remember that if you're overly enthusiastic, the client may think twice about returning.

Following the friction, massage the upper arm and shoulder area. It's also helpful, if you know how, to work on the subscapularis directly by forcefully gliding your fingers under the scapula. Massage the upper back and neck as well to improve circulation to the shoulder.

1. Location and Friction Technique

Place the client's palm on her thigh while she lies supine. With your thumb, find the coracoid process at the front of the shoulder. Move about one half inch laterally to the medial surface of the humerus (just opposite it) and medial to the bicipital groove (see Friction1).



Friction 1



Friction 1A

The friction is done vertically head to toe because the tendon attaches in a horizontal direction. Apply the friction pressure upward and relax on the down motion.

Accent the friction at the upper or lower half of the tendon if you are skilled enough to evaluate and palpate accurately. Continue this for five to 10 minutes, taking breaks as needed. If you or the client needs a break from the friction therapy, massage the upper arm for a while, then dry your hand and have another go at the tendon. Treatment will take anywhere from three weeks to three months depending on the severity and length of time the injury has been present.

2. Exercise Therapy

If done consistently, this tendon exercise program¹ is very effective. The stretching realigns the scar tissue fibers so they heal correctly, and the weight-calibrated exercises systematically increase the strength of the tendon. This procedure must be performed every day for six to eight weeks for it to be effective. If the client's personality is such that she will not do it consistently, this is not the program to recommend. In these cases, try giving the client strengthening exercises only.

There are five steps to the program: warm-up, stretch, exercise, stretch, and ice. Instruct your client to do the following:

1. First warm up the tendon by circling the arm for three or four minutes. Stand with the arm 3 or 4 inches in front of the body and make big, slow circles in front of you.
2. Stretch the tendon five times for 30 seconds each time. The stretch mimics passive lateral rotation. Lie on a table or bed with the injured arm toward the edge. Keep the upper arm in close to the body with the elbow bent at 90 degrees.



Stretch

Now grip a 2- to 5-pound weight and lower the forearm toward the floor into a stretched position (see Stretch). Relax in that position, stretching the subscapularis in the front of the shoulder. Each stretch is held for 30 seconds. Only a slight pull, not pain, should be felt in the shoulder. Rest a moment between stretches and be sure to hold each stretch for the full 30 seconds and repeat five

times. (For a few weeks in a row, always check that the client is doing this correctly because it's frequently remembered incorrectly.)

3. The Exercise: This exercise mimics resisted medial rotation. Begin lying supine with the forearm held in a vertical position, holding the appropriate weight. (Exercise 1)



Exercise 1 — Mimicking resisted medial rotation



Exercise 1A — Stretched position

Now lower the arm to the position in the previous exercise — the stretched position (Exercise 1A). Then keep raising and lowering the arm. Always do three sets of 10 repetitions of this exercise. If the exercise causes pain when the arm is fully extended, laterally rotate the arm as far as possible without discomfort.

In order for this exercise program to be effective, only the third set of 10 should cause some tiredness or stress. This challenges the tendon structure and causes it to strengthen. Begin with 1 to 3 pounds. If there is no stress and you do not get tired, not enough weight is being used. Try again the next day with a little more weight. If fatigue or distress is felt during the first 10 or 20 repetitions, too much weight is being used. Stop and begin the next day with less weight.

During the second week, increase the weight to an amount that will cause slight stress (usually 1 or 2 more pounds) in the last 10 repetitions. Of course, if

the original weight is still causing some fatigue, stay at that level a little longer. At the beginning of each new week, increase the weight again. Do this each week for six to eight weeks.

4. Stretch five times for 30 seconds each, exactly as in No. 2 above.
5. Apply ice or heat to the affected area for five to 10 minutes.

This program must be done every day, seven days a week, or it will not be effective. It is usually done once a day at first, but should be done twice a day after about two weeks. A person may occasionally feel slight discomfort afterward for several hours. This discomfort is all right unless soreness lasts for several days. If the discomfort persists, discontinue the program until you get some help in figuring out what has gone wrong.

3. Injection

When the adhesive scar tissue formation is too severe or when the injury is many years old, hands-on therapy may fail to be effective. In these cases, one or two corticosteroid injections performed by a very skilled physician are often effective within a week or two, but they should be followed by several weeks of rehabilitative exercise as described above. To counteract the weakening effect of corticosteroids, proliferant injections can be performed by a qualified physician to strengthen the tendon structure. The proliferant is a controlled irritant that strengthens the tendon and can also tighten an over-stretched tendon which may result from distended scar tissue or multiple dislocations.

Principles at Work

Build your skills at doing friction slowly so that you gradually build your strength without injuring yourself. Remember to place your fingers on the injured structure and then move your entire wrist to friction, not just your fingers. If you do friction of this type using your finger muscles exclusively, you will end up needing friction therapy instead of giving it.

While you are in the process of gaining these skills, the effectiveness of your treatment will be uneven. Your clients may get better more slowly than expected. As you gain experience and master the techniques, you will be more precise and clients will improve more quickly. Be patient with yourself — learning occurs slowly. **M&B**

Reference

I Curwin, S. *Tendinitis: Its etiology and treatment*. Lexington, MA: Collamore Press; 1984.

Ben Benjamin, Ph.D., holds a doctorate in education and sports medicine. He is the founder and president of the Muscular Therapy Institute in Cambridge, Mass., and has been in private practice for 40 years. He is the author of Listen to Your Pain, Are You Tense? and Exercise Without Injury. He can be contacted at bb@mtti.com.