

# Shoulder Series #2

# Supraspinatus

# Tendinitis

By Ben Benjamin

Part 1 of this three-part series began with the application of what I call the Essential Principles regarding pain, injury, and the body's healing process to what are commonly called "rotator cuff" injuries. Clients who come to us with shoulder pain can be particularly difficult to treat because their pain symptoms often present a confusing picture. Therapists may feel they are treating such clients in a hit-or-miss fashion, not knowing exactly what will help.

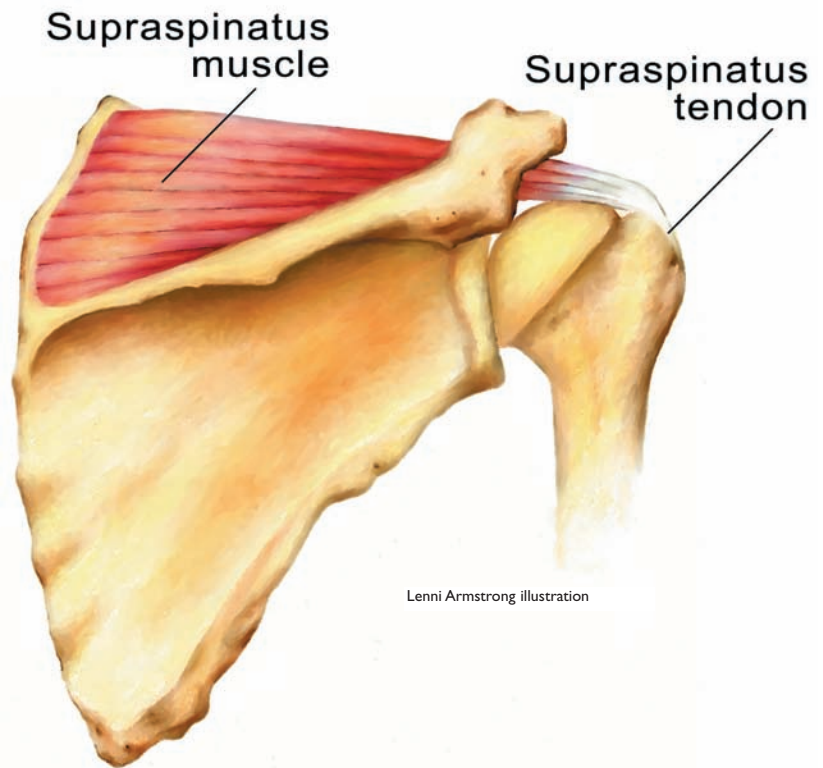
Part 2 continues our exploration of how the Essential Principles can help us distinguish exactly which rotator cuff structure is injured. In this article, we will discuss how to differentiate the supraspinatus from the other rotator cuff tendons and how best to approach its treatment.

### The Nature of Injury in Supraspinatus Tendinitis

Supraspinatus tendon strain is a very common cause of pain in the shoulder. This tendon can be injured in many ways. Swimming, lifting heavy objects, or carrying a heavy suitcase or massage table are a few of the ways to get this injury. Athletes often suffer severe injury to this tendon and older individuals sometimes rupture it, making it impossible for them to lift their arm out to the side.

The supraspinatus is a small and generally weak muscle which runs along the upper portion of the scapula in the supraspinous fossa and attaches laterally to the top of the humerus at the superior facet of the greater tubercle. The tendon fibers usually strain and tear at the tenoperiosteal junction; the tendon can also tear where it attaches to the muscle at the musculo-tendinous junction. Injury to the tendon usually occurs at either the superficial distal end (the part of the tendon attachment nearer the skin surface) or at the deep distal end of the tendon (the deep part of the tendon near the bone). The supraspinatus tendon is flat in appearance and approximately a quarter inch in width. The body of the tendon is about an inch long and is concealed under the acromion.

The supraspinatus muscle initiates abduction, allowing you to move the arm away from the side of the body up to 15 or 20 degrees, or about 12 inches from the body, before other muscles take over the action. Above this level the supraspinatus keeps working, but minimally. It is often called the suitcase muscle because it is especially used when carrying a suitcase held away from the side of the body, trying to prevent the suitcase from banging into the outside of one's knee. A person uses this muscle often when performing certain outward circular massage strokes, and many massage therapists and bodyworkers are afflicted with this injury.



Lenni Armstrong illustration

This injury often occurs for no apparent reason, and the exact cause may be difficult to pinpoint. The supraspinatus muscle is very weak in most people, and if called on to do a sudden, strenuous activity, it can easily tear. The tendon can be injured just as easily when you scrub a pot with unusual vigor as when you engage in strenuous athletic activity. Supraspinatus tendinitis might also occur as a result of a severe fall, where the hand is placed in front of the person to break the momentum.

### Pain as a Signal

Whatever the precipitating event, the pain in supraspinatus tendinitis is usually felt several hours after the activity, as with many tendon strains. Pain may be experienced when the arm is extended, at shoulder height, out to the side of the body, or when reaching high overhead. When the injury is really severe, pain can be referred all the way down to the wrist. In milder cases, the pain stays in the upper arm or as a vague pain in the shoulder.

When you perform the assessment tests for this injury, the client will often feel pain in different places such as down the back of the upper arm, in the belly of the biceps, the forearm, and/or in the deltoid area. Therefore, during testing, don't pay too much attention to where the pain is felt as long as it is somewhere in the arm or shoulder. Even though the pain is felt elsewhere, it is usually being caused by a micro tear at the attachment of the tendon to the bone, in an area approximately one quarter inch square.

## Scar Tissue and Chronic Pain in Supraspinatus Tendinitis

This injury can persist for years if not accurately assessed and treated. The Essential Principle of adhesive scar tissue formation explains how this can happen. Let's say that as a youth your client tore some of the supraspinatus tendon fibers during a tournament swim. She might have felt some pain at the time, but the injury seemed to heal completely on its own. Unfortunately, it is likely that some adhesive scar tissue from that healing remained in the tendon. Years later, the client ran through the airport carrying her heavy suitcase and then noticed a sore shoulder for a week or so. What she didn't know was that more of the tendon fibers tore around her original injury, and the area of weak adhesive scar tissue increased. Then last winter, she fell forward on the ice and caught herself with her arms; since then, she's experienced daily shoulder pain. The built-up adhesive scar tissue left her subscapularis muscle in a weak and vulnerable condition, so that when called upon in an emergency, the muscle could not do its job and suffered further injury.

In general, when a client comes to you with this type of shoulder pain, always have her see a physician to check for serious underlying conditions or injuries. If a fall or trauma brought on the injury, it is wise to have the person go for an X-ray to see if there is a fracture. When the X-ray is read, deposits of calcium are sometimes found in the supraspinatus tendon. It is often assumed that these deposits, rather than an inflammation in the tendon, are the cause of pain, and surgery may be recommended. Supraspinatus pain that is due to calcium deposits in the tendon is unusual but is successfully treated by surgery. There are often calcium deposits present, too, which cause no pain.

## Injury Verification

The precise differentiation of the various rotator cuff injuries is very important if treatment is to be administered correctly. As mentioned earlier, the term "rotator cuff injury" is not all that helpful in identifying the exact location of the injury so treatment can be effective.

The important positive test for supraspinatus tendinitis is pain felt on resisted abduction. If the tendon is injured at the deep distal end of the tendon, there will also be pain on the test called "passive elevation of the arm." This test, described here, compresses the deeper fibers of the tendon between the head of the humerus and the acromion. If there is a so-called painful arc, then the tendon is injured at the superficial distal end. This test compresses superficial fibers of the tendon between the head of the humerus and the acromion when the arm is out to the side between approximately 70 degrees and 110 degrees from the body. If both of these tests cause pain (passive elevation and the painful arc test), then both the deep and superficial aspects of the tendon attachment are injured.

If resisted abduction is the only test that causes pain, then the supraspinatus is injured at the musculo-tendinous junction. This injury is fairly uncommon, so I will not cover the friction technique for it in this article. It can be found, however, in the *Textbook of Orthopedic Medicine*, Volume II, by Dr. James Cyriax.

To summarize: The primary test for this injury is resisted abduction, Test #1 below. The secondary or auxiliary tests, #2 and #3, only tell you precisely what part of the tendon is injured (i.e., the deeper part near the bone or the superficial part right under the skin surface). With this information, you will know how hard to press when frictioning.

## Test 1 — Resisted Abduction



With the client standing, the therapist places one hand on the outside of the client's elbow and the other hand around the waist on the opposite side of the body to stabilize the person. Ask the client to push the arm out (laterally) toward you while you push in the opposite direction offering an equal and opposite resistance. When the client pushes out, allow the arm to move approximately 2 inches away from the body before offering equal resistance. In this position, the muscle is in the midrange with maximum mechanical advantage and strength.

Another Essential Principle is that during any resisted test, the subject pushes gently at first. If no pain is felt, have the client push harder. It is important that the person does not move the arm through space while you are doing the resisted test. Therefore, your resistance should match the strength of the subject.

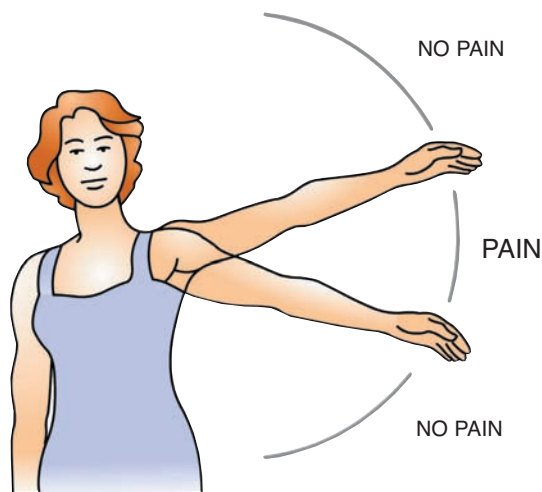
If Test #1 causes discomfort while you are pushing, the supraspinatus is injured. But if the client feels pain after you release pressure and let go, another injury is present; most likely, the subscapularis or infraspinatus tendon is injured. If there is no strength whatsoever and the client cannot push out at all on Test #1, the tendon may be ruptured. →

## Test 2 — Passive Elevation



First say to the client, “Raise your arm above your head.” Then place one of your hands on the client’s elbow and your other hand at the back of the same shoulder with your fingers wrapped around the top of the shoulder to stabilize the joint. Now tell the person to relax while you passively test the arm. Push the arm back in a diagonal direction behind the person’s head (medial and slightly posterior) until you come to the very end of the range of movement. If there is still no pain felt, give the arm a slight jerk in the same direction. This jerk is always done at the very end of the range of motion. Pain on this test indicates that the deep distal end of the tendon is injured.

## Test 3 — The Painful Arc



Ask the client to lift the arm very slowly out to the side, palm down, until the arm is above the head. Instruct the client to stop if there is pain, and then continue the motion to see if the pain ceases. A painful arc means there is no pain at the beginning of the arc (the first 70 to 80 degrees), pain in the midrange of the arc (from 70 to 110 degrees) and no pain at the top of the arc (110 to 180 degrees). Pain on this test indicates that the superficial distal end of the supraspinatus tendon is injured.

## Healing Injured Tissues

**S**elf Treatment — If the strain is minor, several weeks’ rest will probably be all that is needed. If it is severe or if adhesive scar tissue has already formed, discomfort may go on for months, years, or indefinitely. If pain is still present two to three weeks after the injury, the person should seek treatment from a qualified health care provider.

**Treatment** — The supraspinatus, as mentioned earlier, is generally injured in two different places — at the deep distal end and at the superficial distal end. In order for treatment to be effective, the therapist first has to find the exact location of the injury as described earlier.

In addition, when dealing with shoulder injuries, always remember the Essential Principle known as “referred pain.” And, don’t forget to explain the concept of referred pain to the client so she doesn’t think you are working in the wrong area. A client who feels pain in the biceps will not understand why you are working at the top of the shoulder, unless you explain how referred pain works.

**I. Friction Therapy and Massage.** I have used this method of treatment on many supraspinatus tendons with great success. It is often very effective within a relatively short period of time. In minor cases, several weeks of treatment is required; in more serious cases six to 10 weeks may be necessary.

The Essential Principle behind how friction therapy works is this: Friction therapy breaks down adhesive scar tissue that prevents proper healing within muscles, ligaments, and tendons. It separates adhesions and allows normal healing to occur. Friction therapy also increases the blood circulation to areas that normally have very little blood supply; it accomplishes this through a mild, controlled trauma to the tendons and ligaments. I suggest that frictioning be done in one direction only so both the client and the practitioner can rest momentarily between each stroke. This method is kinder and gentler than working in both directions at once.

To place the supraspinatus tendon in a position that makes it accessible for treatment, ask the client to put the hand of the injured shoulder behind the back while in a sitting position, and then relax the arm. The tendon can be palpated and treated only in this position. The humerus must be rotated anteriorly to bring the supraspinatus tendon out from under the acromion. In this position, the tendon lies almost vertical and is accessible to the therapist’s finger.



**Photo A — Locating the supraspinatus tendon.**

If you stand in front of the client, the thumb can be used to friction; if you stand to the side, the index finger works well. Stand in front of the client's shoulder to find the tendon. To locate the injured site, find the lateral edge of the acromion with your thumb and work your way along it to the most anterior portion where there is a small bony prominence or bump. (The acromion is the uppermost portion of the scapula right above the head of the humerus.) (See Photos A and B.)



**Photo B — Locating the supraspinatus tendon.**

Now, with your thumb in the exact center on the very front edge of the acromion, and held in a horizontal position, slide your thumb inferiorly down in front about a quarter inch so that half of your thumb is on the head of the humerus and the other half remains on the acromion. The distal end of the tendon is down on the humerus in this groove between the acromion and the humerus — you should be right on it. Since the tendon is coming vertically down in front, you must apply friction in a horizontal direction (remember to apply pressure in one direction only). As you friction, you will snap over the tendon if you are in the right spot. Place the finger or thumb on the tendon and perform the friction motion laterally, with light pressure for a superficial distal end injury and with moderate to heavy pressure for deep distal end tendinitis. Continue the friction for 6 to 12 minutes, taking breaks as needed. The first time you do it on the client, work for a shorter time (3 to 5 minutes) until both of you get used to it.

Do not give the client too much discomfort while performing the friction therapy. Start with a very light pressure and slowly increase the force as the tendon gets numbed with your friction. Always watch the client's face for signs of pain. Start as gently as you need to; your efforts will be in vain if your client doesn't come back because it hurt too much. The treatment should feel annoying, not painful. Don't try to friction away all the scar tissue in one session; take your time. Following the frictioning, massage the upper arm and shoulder area. If you know how to massage the supraspinatus muscle in the supraspinatus fossa, that is helpful as well. Massage the upper back and neck also to improve the general circulation.

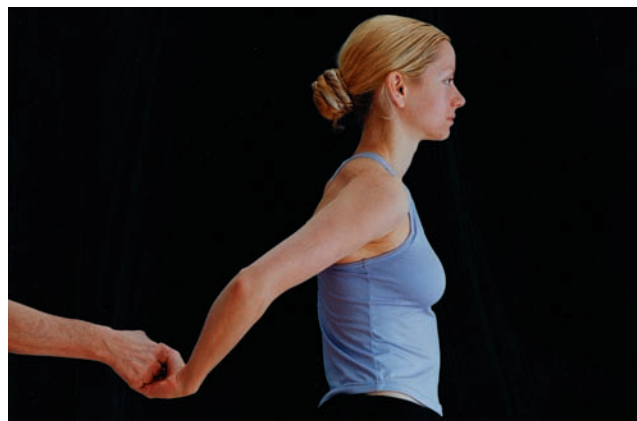
With a relatively fresh injury, treatment of supraspinatus tendinitis usually begins to be effective in two to three weeks. For more long-standing cases, treatment may last from two to four months. Friction therapy should be administered twice a week and should be performed in conjunction with massage and the exercise program described below. Treatment time can vary depending on the severity of the injury, the general health of the client, and length of time the injury has been present.

## 2. Exercise Therapy<sup>1</sup>

This tendon exercise program is very effective if done consistently. The stretching realigns the scar tissue fibers so they can heal correctly, and the weight-calibrated exercises systematically increase the tendon strength. 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 program is not the one 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 or heat.

1. First warm up the muscle-tendon unit by having the client circle the arm for three or four minutes. She should stand with the arm 2 or 3 inches in front of her body and make a big, slow circle in front of her. Be sure she makes a circular arc or movement that is not painful.
2. Stretch the tendon five times for 30 seconds each time.



**Photo C — Stretch the tendon for 30 seconds.**

The stretch mimics passive medial rotation. Stand the client in front of a doorknob with her back to it. Have her grip the doorknob with her arm behind her and lunge slowly forward with one foot in front of the other. The gripping hand should be in line with the spine as it stretches behind her. Each stretch is held for 30 seconds. Only a mild pulling sensation should be felt in the shoulder, not pain. Have her rest a moment between stretches, and be sure she holds each stretch for the full 30 seconds repeating it five times. For a few weeks, check that clients are doing this exercise correctly. They frequently get it wrong.



Photos D and E — Gradual strengthening exercise.



Photo F — Proper positioning for applying ice or heat.

3. The Exercise: This exercise mimics resisted abduction. Have the client lie on her side with the injured arm toward the ceiling. Holding the appropriate weight, she should lift the arm slowly toward the ceiling about 20 to 30 degrees only, then bring it back down to her side without resting it on her hip. If using a weight causes discomfort, use no weight at all. If no weight causes discomfort, bend the arm at the elbow to about 90 degrees as this shortens the lever arm and effectively lightens the weight of the arm that is being lifted. Always do three sets of 10 of this exercise.

For the exercise part of the program to be effective, only the third set of 10 should cause some tiredness or stress in the shoulder. This exercise challenges the tendon structure and causes it to strengthen. 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. If no tiredness or stress is felt, not enough weight is being used. Try again the next day with a little more weight. If any weight is too much, begin with no weight at first as this muscle is quite weak in most people. If that proves too easy, try one-half to 1 pound to begin.

Once you establish the correct weight for the client's condition, use the same weight for a week or so or until the exercise seems easy. Then, during the second week, increase the amount of weight to that which will cause tiredness in the last 10 repetitions (usually a 1-pound increment). Of course, if the exercise is still difficult, stay at the same level of weight a little longer. At the beginning of each new week, increase the weight again. Do this each week for six to eight weeks. Most people need to start with 1 or 2 pounds and build up to 5 or 6 pounds over the next six to eight weeks.

4. Stretch five times for 30 seconds each, exactly as in #2 above.

5. Apply ice or heat to the affected area for five minutes.

In order for the ice or heat to reach the tendon, the client must lie face up with the hand behind the back in the medially rotated position so as to expose the tendon in front and slightly below the acromion. The ice or heat is then applied to the front of the shoulder.

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 feel slight discomfort afterward for several hours. This feeling is all right unless soreness lasts for several days. If the discomfort persists, discontinue the program until the person has had a little more treatment from you. After the client is feeling completely well, the program should be continued for two additional weeks. Encourage your clients to return to full activity very slowly, or they will likely reinjure themselves.

### Principles at Work

As mentioned above, I have had great success using friction therapy in my clients with supraspinatus tendinitis. Learning the Essential Principles changed my practice dramatically for the better with these clients and many others. Work to understand these principles well, and they will help you to improve your practice, too. **M&B**

### Reference

<sup>1</sup> Curwin and Stanish. Tendinitis: Its etiology and treatment. 1984: D.C. Heath and Company.

*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.*