



# Thoracic Outlet Syndrome

## DESCRIPTION

Thoracic outlet syndrome is characterized by pain and weakness from compression of nerves and less commonly from compression of arteries and veins in the neck, which may affect the shoulders, arms, and hands.

## COMMON SIGNS AND SYMPTOMS

- Pain, numbness, and tingling in the neck, shoulders, arms, and hands
- Weakness in the arms and hands
- Poor circulation, characterized by coldness, swelling, and blueness in the hands and fingers (rare)

## CAUSES

The nerves and blood vessels that supply the shoulders, arms, and hands start in the neck and pass as a group near the ribs and collarbone. Pressure on the nerves or the blood vessel bundle creates symptoms. Pressure may be caused by an extra rib near the lower neck, called a *cervical rib*; overdeveloped neck muscles, as may be required with some contact sports or may result from overzealous weight-lifting programs; muscle weakness; and drooping of the shoulder. Other causes include injury from overextending the arm or shoulder and abnormal positioning of the arm or neck for a prolonged period, such as can occur during surgery, while unconscious for any reason, or while sleeping with a too-firm object under the neck. Rarely, a tumor that has spread to the head and neck area from another part of the body may cause pressure on the nerve or blood vessel bundle.

## FACTORS THAT INCREASE RISK

- Fracture of the clavicle or first rib
- Bodybuilding, with muscle bulk in the thoracic outlet area near the collarbone
- Rapid weight loss combined with vigorous physical exercise or exertion

## PREVENTIVE MEASURES

- Avoid shoulder and neck injury whenever possible.
- Wear protective equipment appropriate for your sport.
- Maintain good posture.
- Avoid carrying a bag or backpack on the affected side.
- Change sleeping positions. Try sleeping on one side, or sleep without a firm pillow.
- If symptoms are caused from overdeveloped neck muscles, reduce exercises that build the neck muscles.

## EXPECTED OUTCOME

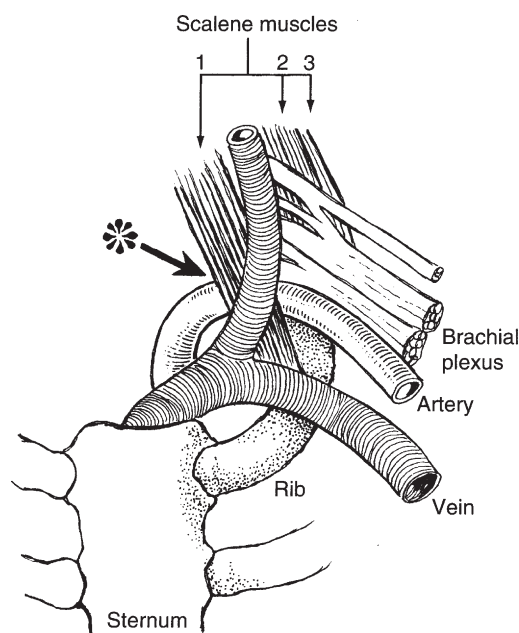
Thoracic outlet syndrome is usually curable in most patients with physical therapy or changes in sleeping habits. However, surgery is occasionally necessary if symptoms persist despite therapy.

## POSSIBLE COMPLICATIONS

- Permanent numbness or loss of arm or hand strength if untreated
- Postoperative pain or abnormal sensation in the arm or hand (rare)
- Persistence or recurrence of the disorder after surgery
- Acute thrombosis (clotting) of the axillary vein, an emergency that *must be treated immediately*
- Can result in stroke or pulmonary embolism

## GENERAL TREATMENT CONSIDERATIONS

Initial treatment involves medications and avoiding the activity that initially caused the problem. Physical therapy and exercises are usually prescribed to promote shoulder muscle function and improve any posture abnormalities. Avoid straining or heavy activity for 3 months. Surgery to relieve pressure on the nerves and blood vessels, such as removal of all or part of an extra cervical rib, or to cut muscles pressing on the bundle may be indicated,



**FIGURE 1** From Economou SG, Economou TS: *Instructions for surgery patients*, Philadelphia, 1998, W.B. Saunders, p 605.

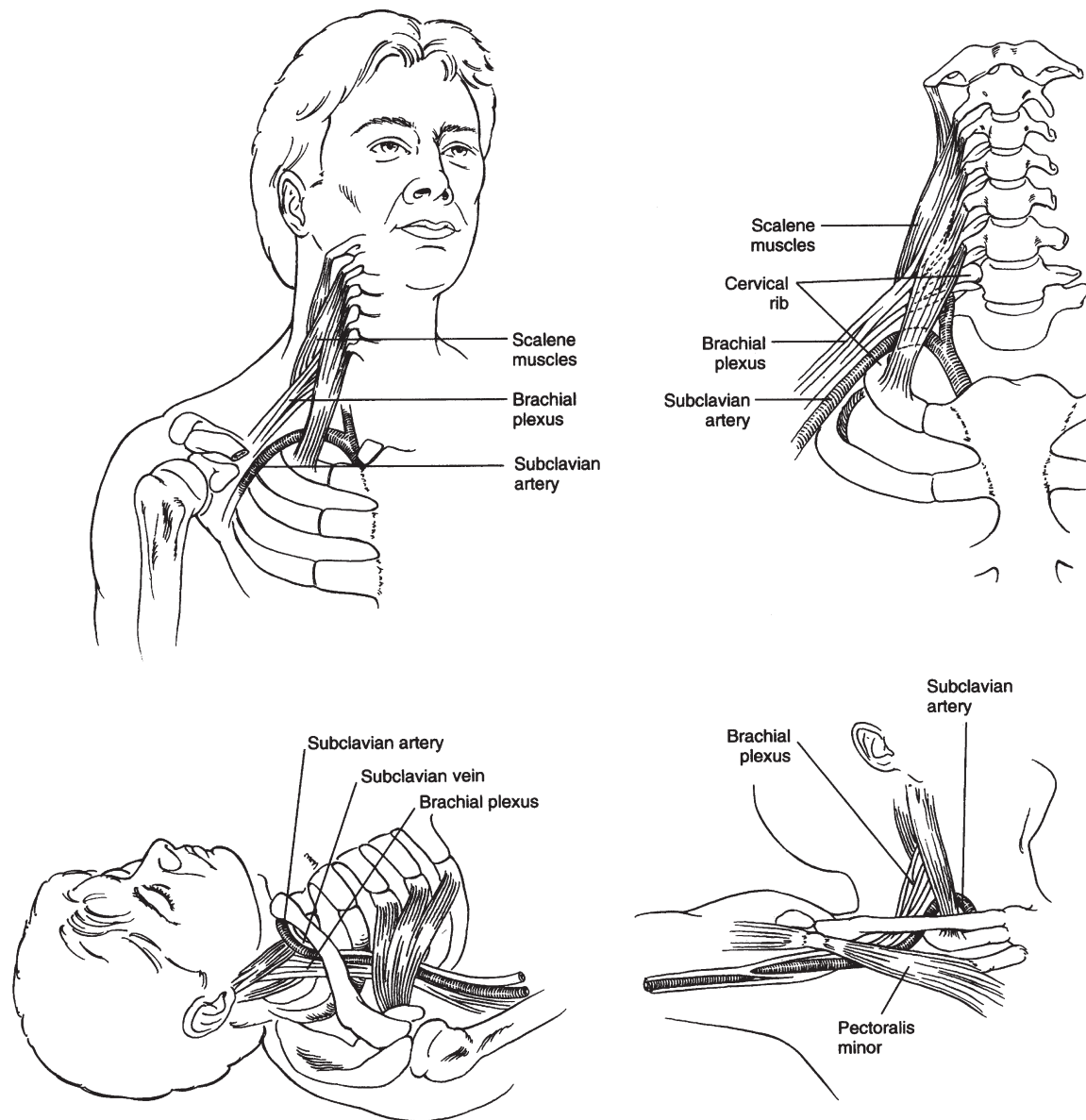


FIGURE 2 From Zachazewski JE, Magee DJ, Quillen WS: *Athletic injuries and rehabilitation*, Philadelphia, 1997, W.B. Saunders, p 447.

particularly if symptoms persist despite 6 months of activity modification, therapy, and exercises.

**MEDICATION**

- Nonsteroidal antiinflammatory medications, such as aspirin and ibuprofen (do not take for 7 days before surgery), or other over-the-counter pain relievers, such as acetaminophen, are often recommended. Take these as directed by your physician, and contact your doctor immediately if any bleeding, stomach upset, or signs of an allergic reaction occur.
- Antispasmodics and muscle relaxers may be prescribed. Use these only as directed, and take only as much as you need.

**WHEN TO CALL YOUR DOCTOR**

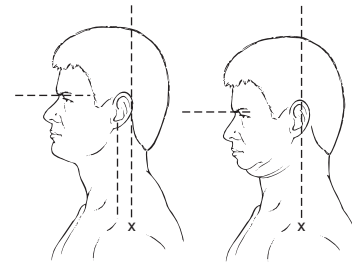
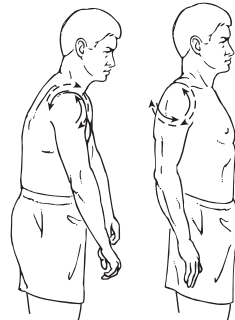
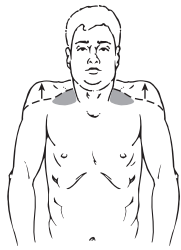
- Symptoms worsen or do not improve in 6 weeks despite treatment.
- You develop coldness, swelling, or blueness in your hands or fingers.
- New, unexplained symptoms develop. Drugs used in treatment may produce side effects.

### RANGE OF MOTION AND STRETCHING EXERCISES

#### Thoracic Outlet Syndrome

These are some of the *initial* exercises you may use to start your rehabilitation program, until you see your physician, physical therapist, or athletic trainer again, or until your symptoms resolve. Emphasis is placed on improving posture. The most common poor posture seen with thoracic outlet syndrome involves standing with rounded shoulders and a forward head. These initial exercises will assist you in practicing proper posture. Please remember:

- Flexible tissue is more tolerant of the stresses placed on it.
- A *gentle* stretching sensation should be felt.



### RANGE OF MOTION • Cervical Spine

#### Axial Extension

1. Sit in a chair or stand in your normal posture.
2. Gently tuck your chin, and glide your head backward. Keep your eyes level as shown. You should not end up looking up or looking down.
3. You will feel a stretch in the back of your neck and at the top of your shoulders. Hold this position for \_\_\_\_ seconds.
4. Repeat this exercise \_\_\_\_ times, \_\_\_\_ times per day.

### RANGE OF MOTION • Scapula Elevation, Shrugs

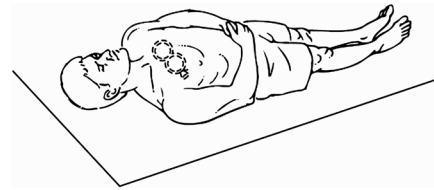
1. Stand in a good, erect posture with your arms at your sides.
2. Gently shrug your shoulders up and back toward your ears.
3. Hold this position for \_\_\_\_ seconds, and *slowly* return to the starting position.
4. Repeat this exercise \_\_\_\_ times, \_\_\_\_ times per day.

You may perform this exercise with a \_\_\_\_ pound weight in each hand. Avoid standing in a slouched position with poor posture by using this technique intermittently throughout the day.



**RANGE OF MOTION • Upper Thoracic Extension**

1. Sit erect using good posture in a chair with a firm, high back as shown. If the chair does not have good lumbar support, place a small, rolled-up towel in the small of your back as shown.
2. Clasp your hands together behind your neck, and bring your elbows together under your chin, gently cradling and supporting your head and neck. This will prevent your neck from bending backward.
3. *Bend backward through the upper back* over the top of the chair. When you do this, your shoulders and elbows should move upward and backward. You should feel a stretch at the base of your neck and at the top of your shoulder blades.
4. Hold this position for \_\_\_\_ seconds, and return to the starting position.
5. Repeat this exercise \_\_\_\_ times, \_\_\_\_ times per day.



**RANGE OF MOTION • Mid-Thoracic Extension**

1. Place two racquetballs in a small sock as shown. Tie off the end of the sock.
2. Lie on your back with the sock placed as shown. Your spine should be cradled between the two balls.
3. Lie in one position for 15 to 30 seconds. Gently move your body 1 to 2 inches, rolling the balls to a new position. Repeat, moving the balls as appropriate, as long as you continue to feel a stretch.
4. Repeat this exercise \_\_\_\_ times, \_\_\_\_ times per day.



**FLEXIBILITY • Scapula Retraction/ Pectoralis Minor Stretch**

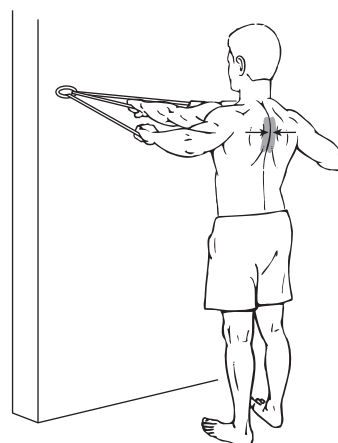
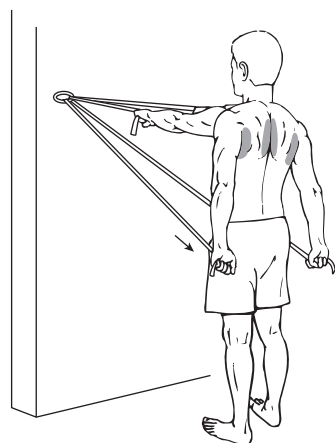
1. Roll up a long towel or use a roll made of foam. Lie on the roll lengthwise as shown, with your head and buttocks supported by the roll.
2. Allow your shoulder blades to drape over the roll as your elbows rest on the floor. You should feel a *gentle* stretch in the front of your chest.
3. Hold this position for \_\_\_\_ seconds. To increase the stretch, move your arms toward your head. *Be careful: This is a powerful stretch.*
4. Repeat this exercise \_\_\_\_ times, \_\_\_\_ times per day.

### STRENGTHENING EXERCISES

#### Thoracic Outlet Syndrome

These are some of the *initial* exercises you may use to start your rehabilitation program, until you see your physician, physical therapist, or athletic trainer again, or until your symptoms resolve. *These exercises should not cause an increase in your symptoms; if they do, stop them immediately and consult your physician, physical therapist, or athletic trainer.* Emphasis should be placed on performing these exercises using proper posture with light resistance. Endurance and posture are key. Make sure that you use a good, upright posture when doing this exercise. Please remember:

- Strong muscles with good endurance tolerate stress better.
- Do the exercises as *initially* prescribed by your physician, physical therapist, or athletic trainer.
- Progress slowly with each exercise under their guidance, gradually increasing the number of repetitions and weight used.



#### STRENGTH • Scapular Retraction

1. Anchor a rubber band/tubing to a stable, fixed object.
2. Hold one end of the band/tubing in each hand with your arms out straight in front of you.
3. Squeeze your shoulder blades together, and pull your arms back as shown. Your hands should be level with your shoulders when you finish. Do not let your elbows go behind your body.
4. Hold this position for \_\_\_\_ seconds, and *slowly* return to the starting position.
5. Repeat this exercise \_\_\_\_ times, \_\_\_\_ times per day.

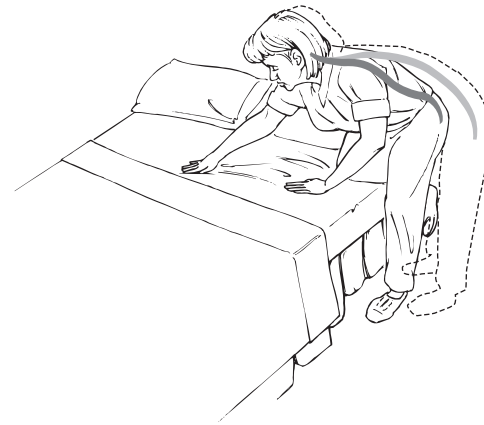
#### STRENGTH • Shoulder Extension

1. Anchor a rubber band/tubing around a stable object, such as a stair post, or around the knob of a closed door.
2. Stand holding the rubber band/tubing in front of you with your arms extended as shown.
3. Squeeze your shoulder blades together, and pull your arms down and backward as shown. *Do not pull your arms past the midline of your body.*
4. Hold this position for \_\_\_\_ seconds, and *slowly* return to the starting position.
5. Repeat this exercise \_\_\_\_ times, \_\_\_\_ times per day.

**POSTURE AND BODY MECHANICS**  
Thoracic Outlet Syndrome

Maintaining the most appropriate posture and using correct body mechanics can have a significant effect on back pain. The following are basic suggestions regarding proper posture and body mechanics. These should be specifically discussed with your physician, physical therapist, or athletic trainer. Please remember:

- Good posture minimizes the stress and strain on any portion of your spine.
- Incorporate these posture principles into all of your daily and recreational activities.



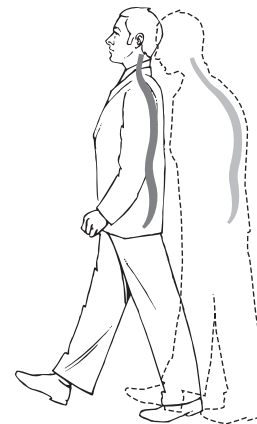
**PROLONGED ACTIVITY IN A FLEXED POSITION**

Try to avoid doing any activity in a flexed (bent) position for a prolonged period of time. Put one leg up if possible, which will minimize the stress on your back. You should also attempt to keep a normal spinal posture when doing any activity.



**PROLONGED STANDING IN SLIGHT FLEXION**

When you must stand in a position that requires a prolonged period in slight flexion, consider finding a footstool or some other object to place one foot on. This will assist in minimizing the load on your back.



**SLOUCHING**

Avoid slouching when you walk or stand. Stand up straight, and walk erect and tall.



### WORKING AT A DESK

When sitting at a desk or workstation, make sure you attempt to do the following:

1. Have an adjustable-height chair. It is critical that your feet touch the floor. If this is not possible because of the chair and/or desk height, use a footrest.
2. Make sure your chair fits under your desk, so you can pull as close to your work surface as you need to.
3. Avoid slouching. Use a lumbar roll, cushion, or pillow behind your lower back.
4. Make sure your work surface is the appropriate height.