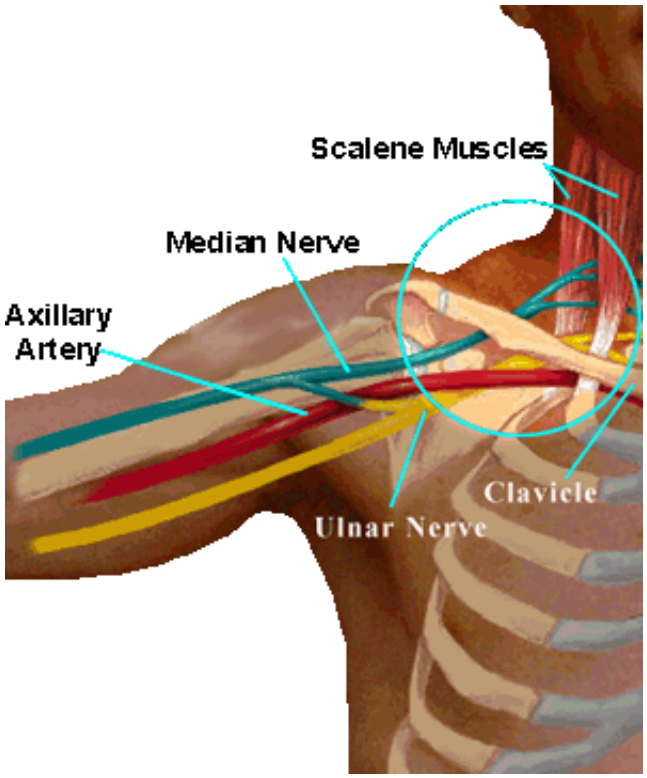
Thoracic Outlet Syndrome

Introduction
Thoracic Outlet Syndrome (TOS) is a condition affecting the shoulder, arm, and hand. This condition is a very frustrating problem - both for the patient and for the physician. It is extremely difficult to prove that the diagnosis of Thoracic Outlet Syndrome is correct, because there is no test that has a high degree of accuracy in showing the problem. Usually, the diagnosis is made after all other causes of the symptoms have been ruled out - a frustrating and slow process sometimes!

Anatomy
The nerves and blood vessels that run into the arm and hand start at the side of the neck. They exit from the side of the spine through small openings between each vertebra called foramen. As they leave the spine the nerves are referred to as nerve roots. The individual spinal nerve roots then begin to join together to form the nerves that will run into the arm and hand.

The nerves travel between two muscles in the neck (the scalene muscles), over the top of the rib cage, under the collar bone (clavicle), through the arm pit (axilla) and down the arm to the hand. The area where the nerves and vessels leave the neck between the two scalene muscles and over the first rib is know as the Thoracic Outlet.



Causes

There are probably several causes of TOS. The common underlying cause of the syndrome is compression of the nerves and arteries of the arm in the Thoracic Outlet. Some people have an extra first rib or an old fracture of the clavicle, which limits the space for the vessels. A violent injury, such as a car wreck while wearing a shoulder harness, may also tear the scalene muscles.

In the healing phases of this type injury, scar tissue may form in the healing muscle, leading to compression of the nerves and blood vessels. Compression can also occur with repetitive activities that require the arms to be held overhead or extended forward. The more likely cause is slouching forward and dropping the shoulders; causing tension in the muscles at side of the neck and constricting the arteries and nerves.

Symptoms
Symptoms of TOS include pain, weakness, numbness and tingling, swelling, fatigue or coldness in the arm and hand. This syndrome can be very difficult to diagnose. The symptoms can mimic many other conditions, such as a herniated disk in the neck, carpal tunnel syndrome, and even bursitis of the shoulder.

Diagnosis
Diagnosis of TOS can be difficult and frustrating. The history and physical examination can be suggestive of TOS, but frequently the symptoms are vague and difficult to track down. A chest xray may show an extra cervical rib, and be helpful in the diagnosis. Electrical tests of the nerves in the arm may be required. These tests try and determine if the nerves in the arm and hand are being pinched - between where they exit from the spine and where they end at the muscles of the arm and hand. Other special tests to check whether or not the blood vessels that run with the nerve are being pinched may be required to confirm the diagnosis. Many times all of these test are negative and the history and physical examination must be relied on to make the diagnosis. Because the symptoms of TOS are so confusing, and can be caused by other problems - such as a herniated disk in the neck - some tests may be done to make sure that one of these other problems do not exist. This may include X-rays of the neck or a MRI scan of the neck. This process is required to rule out any other causes of your symptoms.

Treatment
A home program of exercise is essential to the treatment of TOS and must be performed consistently to produce benefits. Symptoms often respond to an exercise program addressing healthy posture and muscle balance. Stretching and strengthening along with awareness exercises can help achieve optimal posture.

Symptoms caused by abnormalities in the bones and muscles may not respond to physical therapy but good posture and overall conditioning are very important in treating all causes of TOS. You should limit the length of time the arms are used in outstretched or overhead positions, and in heavy carrying and lifting. Simple things like taking frequent breaks, changing positions, stretching or using a hand truck or cart can bring relief. More specific treatments and exercises may be prescribed by a physician or physical therapist. Rehabilitation may begin with a few exercises to loosen up tight muscles and joints around the compressed nerves and blood vessels. To help restore normal mobility, your therapist may prescribe stretching and massage for the joints, muscles, and nerves.
Work hours can add up to problems. What changes can be made to help avoid these problems?

Occupational ergonomics: A worksite specialist can evaluate your workplace to determine safe alignment, worksite postures, and work-related furniture. Arm positions: Avoid holding your arms outward for prolonged time periods. Work heights: Avoid overhead activities, especially if these positions bring on symptoms. Helpful hints

Decrease tension on the shoulder straps of your seat belt. Use rest periods to decrease fatigue. Women with large, pendulous breasts may benefit from a strapless long-line bra. Obese patients should seek advise for safe weight loss. Things to avoid: Heavy lifting, pulling, pushing. Rapid breathing. Stress. Looking up, bending the neck back. Elevating the arms for long periods. Carrying bags with a strap on the sore-side shoulder.