

Medical Treatment Guidelines

Washington State Department of Labor and Industries

Surgery for thoracic outlet syndrome (TOS)

Type of TOS	Subjective	Objective	Imaging
Vascular TOS arterial.	At least three of the following must be present in the affected upper extremity: A. Pain. B. Swelling or heaviness. C. Decreased temperature or change in color. D. Paresthesias in the ulnar nerve distribution. AND	At least one of the following: A. Pallor or coolness. B. Gangrene of the digits in advanced cases. AND	C. Abnormal arteriogram.
Vascular TOS venous.	At least three of the following must be present in the affected upper extremity: A. Pain. B. Swelling or heaviness. C. Decreased temperature or change in color. D. Paresthesias in the ulnar nerve distribution. AND	At least two of the following: A. Swelling of the arm. B. Venous engorgement. C. Cyanosis. AND	D. Abnormal venogram.
Neurogenic TOS.	In the affected upper extremity: A. Pain. and B. Numbness or paresthesia in the ulnar nerve distribution.	In the affected upper extremity, all of the following electrodiagnostic abnormalities must be found: A. Reduced amplitude median motor response. and B. Reduced amplitude ulnar sensory response. and C. Denervation in muscles innervated by lower trunk of the brachial plexus.	

- *1 The clinical findings in TOS may be similar to those in carpal tunnel syndrome, ulnar neuropathy or cervical radiculopathy. A physician should consider these alternative diagnoses before requesting TOS surgery.
2. Most patients with TOS have cervical ribs.
 3. The Department of Labor and Industries has recently concluded a retrospective study of outcomes of thoracic outlet surgery on patients with Labor and Industries claims. The results indicate that long-term outcomes after TOS surgery are worse than outcomes with medical management of TOS.

See next page for details of criteria.

Reference: Provider Bulletin 95-04; Date Introduced: April 1995.

Medical Treatment Guidelines

Washington State Department of Labor and Industries

Criteria for the electrodiagnostic diagnosis of unilateral neurogenic thoracic outlet syndrome (TOS)**

All 3 of the following criteria must be found in the affected limb:

1. Amplitude of median motor response is reduced.
And
2. Amplitude of ulnar sensory response is reduced.
And
3. Needle exam shows denervation in muscles innervated by lower trunk of brachial plexus.

Details Regarding the Above Noted Criteria:

Criterion #1

- a) Using standard surface electrodes with active pick up over the abductor pollicis brevis, the amplitude of the median motor response on the affected side should be less than 50% of that obtained on the unaffected side.

Criterion #2

- a) Using standard ring electrodes on the fifth digit, the ulnar sensory amplitude on the affected side should be less than 60% of the amplitude on the unaffected side.

Criterion #3

- a) Muscles innervated by the lower trunk of the brachial plexus include the abductor pollicis brevis, pronator quadratus, flexor pollicis longus, first dorsal interosseous, abductor digiti minimi, flexor carpi ulnaris, extensor pollicis brevis, and extensor indicis.
- b) EMG abnormalities in TOS are most commonly seen in median and ulnar innervated intrinsic muscles of the hand -- especially the abductor pollicis brevis.
- c) Positive waves and fibrillations may be found, but chronic denervation changes are more common -- that is, increased motor unit amplitude, increased motor unit duration, and decreased recruitment with rapid firing of motor units are activated.

Notes

The electromyographer should rule out neuropathic conditions that might mimic TOS, specifically cervical radiculopathy, carpal tunnel syndrome, ulnar neuropathy and polyneuropathy.

**Abstracted from Wilbourn A.J. American Association of Electromyography and Electrodiagnosis. Case Report #7: True Neurogenic Thoracic Outlet Syndrome. 1992.