

## Cervicobrachial Syndrome

### A Supplement to L&I's Neurogenic Thoracic Outlet Syndrome Guideline (2010)

This supplement to the neurogenic thoracic outlet syndrome (nTOS) guideline (10/1/2010) is intended to present: 1) New information that has bearing on the October 2010 guideline, and 2) Guidance on diagnosing and treating cervicobrachial syndrome, which can be confused with nTOS. Time limited treatment for cervicobrachial syndrome may be allowed when nTOS criteria are not met.

### Update on the October 2010 nTOS Guideline

The Cochrane Collaborative published a recent review on the evidence for effective treatment of thoracic outlet syndrome.<sup>[1]</sup> The authors found very low or no quality evidence for the benefit of surgical interventions over non-treatment. They concluded that the review was “complicated by a lack of generally accepted diagnostic criteria for the diagnosis of TOS.” Following the publication of the Cochrane review, vascular surgeons published reporting standards to gain some degree of consistency in reporting studies of disputed nTOS. However, these standards were meant as a guide for conducting future studies of nTOS, not definitive criteria to justify surgical intervention.<sup>[2]</sup>

When the insurer receives requests for surgery related to disputed nTOS, consideration includes absence of other reasonably likely diagnoses (cervical pathology, shoulder disease, carpal tunnel syndrome, chronic regional pain syndrome, brachial neuritis). This criterion is important in our workers' compensation system, as studies published to date in this population found that TOS was on average, the 10<sup>th</sup> diagnosis added on to a claim. The symptoms seen in nTOS are common in many diagnoses, and it is critical to perform a detailed neurological examination and adjunctive tests (e.g, MR neurography) to ensure accuracy prior to making a diagnosis of nTOS.

A recent two-part review<sup>[3, 4]</sup> provides criteria differentiating five types of TOS: arterial, venous, traumatic neurovascular, true neurogenic, and disputed neurogenic. This classification scheme is consistent with the criteria required under L&I's TOS guidelines. Further, these reviews characterize most cases of disputed TOS as a cervico-scapular pain syndrome rather than as a true type of TOS. In addition, a recent review of electrodiagnostic (EDS) features of true neurogenic TOS is consistent with criteria implemented in the 2010 L&I TOS guideline.<sup>[5]</sup> The importance of accurately identifying true neurogenic TOS and avoiding invasive surgery for disputed TOS is highlighted by L&I's research on outcomes of injured workers in WA, which demonstrated that the majority of workers who had surgery for purported nTOS had poor outcomes one year after surgery.<sup>[6, 7]</sup> Nearly 20% had new neurological complaints<sup>[7]</sup> and six injured workers suffered phrenic nerve injury, one with life threatening respiratory insufficiency [unpublished data]. Similarly, a case series from Brazil reported that 21 of 29 patients undergoing surgery for nTOS had not returned to work by 6 months post-op due to the presence of pain.<sup>[8]</sup>

## Cervicobrachial Syndrome

Conditions that present with symptoms and signs that mimic those of nTOS, but that upon investigation do not demonstrate either objective neurologic or electrodiagnostic findings consistent with brachial plexus nerve injury are not addressed in the nTOS guideline.

This supplement addresses these conditions, which are described in ICD-10 M53.1 as cervicobrachial syndrome. For purposes of this guideline supplement, cervicobrachial syndrome includes conditions that present primarily with pain and muscle spasm in the cervical/brachial region, including predominant neck and often headache, sometimes accompanied by non-specific sensory symptoms in the affected distal upper extremity. These syndromes have no clearly demonstrable evidence of decreased reflexes, dermatomal sensory loss, specific muscle weakness and/or atrophy of the upper extremity, and no evidence of abnormal electrodiagnostic tests that corroborate the presence of objective brachial plexus involvement. Empirical data from work in normal volunteers and referred patients<sup>[9-13]</sup> led one author to conclude that, “The various neurologic conditions listed [Thoracic outlet syndrome, spinal cord tumors, nerve injuries, myelopathy, radiculopathy] are, by definition, not causes of neck pain. They cause symptoms, not in the neck, but in the upper limb. Furthermore, they cause loss of neurologic function rather than pain.”<sup>[14]</sup>

Cervicobrachial syndrome may be treated with non-surgical treatments that are appropriate for the clinical presentation, including manual therapy, rehabilitation therapies, pain psychology, EMG biofeedback, and medication management. A systematic literature review of non-invasive therapies yielded 11 studies finding generally inconclusive evidence, though potential benefits were demonstrated for manual therapy, exercise, and behavioral therapy.<sup>[15]</sup> General physiotherapy and traction were found to be ineffective. Treatment of cervicobrachial syndrome requires a time-limited, goal-oriented multimodal treatment plan, ideally encompassing physical reactivation and treatment of psychosocial barriers.<sup>[16]</sup> Studies on more specific physical therapy techniques have also shown promise.<sup>[17]</sup> The primary goal of treatment should be functional improvement, with a secondary goal of improvement of pain. The provider should specify what the treatment plan is, how these goals will be measured, and the frequency with which they will report progress measurements to the insurer. Helpful resources have been produced by L&I for [Functional Tracking](#) and for treating [Psychosocial Determinants Influence Recovery](#).

## Botulinum Toxin Injections for Cervicobrachial Syndrome

Botulinum toxin A (BTX-A) injections have been shown to provide temporary reduction of pain intensity and increased pain tolerance in the neck and shoulder area.<sup>[18-22]</sup> Evidence suggests the injections are not curative, as the effects demonstrated are short-term (about 90 days).<sup>[18-22]</sup> As such, L&I considers the treatment temporarily rehabilitative.

In injured workers with signs and symptoms that do not demonstrate objective neurologic findings with corroborating electrodiagnostic results consistent with brachial plexus nerve injury, use of BTX-A may be considered to increase the ability of an injured worker to initiate and complete a time-limited, goal oriented multimodal non-surgical treatment plan. The insurer may approve one course of BTX-A injections in the affected area. One additional course of injections may be authorized at least 90 days after the initial course in accordance with L&I [coverage criteria](#).

## References

1. Povlsen, B., T. Hansson, and S.D. Povlsen, *Treatment for thoracic outlet syndrome*. The Cochrane Library, 2014.
2. Illig, K.A., et al., *Reporting standards of the Society for Vascular Surgery for thoracic outlet syndrome*. Journal of vascular surgery, 2016. **64**(3): p. e23-e35.
3. Ferrante, M.A. and N.D. Ferrante, *The thoracic outlet syndromes: Part 1. Overview of the thoracic outlet syndromes and review of true neurogenic thoracic outlet syndrome*. Muscle & nerve, 2017. **55**(6): p. 782-793.
4. Ferrante, M.A. and N.D. Ferrante, *The thoracic outlet syndromes: Part 2. The arterial, venous, neurovascular, and disputed thoracic outlet syndromes*. Muscle & nerve, 2017. **56**(4): p. 663-673.
5. Tsao, B.E., et al., *Electrodiagnostic features of true neurogenic thoracic outlet syndrome*. Muscle & nerve, 2014. **49**(5): p. 724-727.
6. Franklin, G.M., *Disability and workers' compensation issues in TOS*, in *Thoracic outlet syndrome*, K.A. Illig, et al., Editors. 2013, Springer.
7. Franklin, G.M., et al., *Outcome of surgery for thoracic outlet syndrome in Washington state workers' compensation*. Neurology, 2000. **54**(6): p. 1252-1258.
8. Frandoloso, S.L., et al., *Quality of Life of People with Thoracic Outlet Syndrome after Surgery*. Arquivos Brasileiros de Neurocirurgia: Brazilian Neurosurgery, 2018. **37**(01): p. 1-6.
9. Aprill, C., A. Dwyer, and N. Bogduk, *Cervical zygapophyseal joint pain patterns. II: A clinical evaluation*. Spine, 1990. **15**(6): p. 458-461.
10. Dwyer, A., C. Aprill, and N. Bogduk, *Cervical zygapophyseal joint pain patterns. I: A study in normal volunteers*. Spine, 1990. **15**(6): p. 453-457.
11. Cooper, G., B. Bailey, and N. Bogduk, *Cervical zygapophysial joint pain maps*. Pain Medicine, 2007. **8**(4): p. 344-353.
12. Fukui, S., et al., *Referred pain distribution of the cervical zygapophyseal joints and cervical dorsal rami*. Pain, 1996. **68**(1): p. 79-83.
13. Windsor, R.E., et al., *Electrical stimulation induced cervical medial branch referral patterns*. Pain Physician, 2003. **6**(4): p. 411-418.
14. Bogduk, N., *The anatomy and pathophysiology of neck pain*. Physical Medicine and Rehabilitation Clinics, 2011. **22**(3): p. 367-382.
15. Salt, E., et al., *A systematic literature review on the effectiveness of non-invasive therapy for cervicobrachial pain*. Manual therapy, 2011. **16**(1): p. 53-65.
16. Segura-Pérez, M., et al., *A Multimodal Approach for Myofascial Pain Syndrome: A Prospective Study*. Journal of manipulative and physiological therapeutics, 2017. **40**(6): p. 397-403.
17. Hagberg, M., et al., *Rehabilitation of neck-shoulder pain in women industrial workers: a randomized trial comparing isometric shoulder endurance training with isometric shoulder strength training*. Archives of physical medicine and rehabilitation, 2000. **81**(8): p. 1051-1058.
18. Göbel, H., et al., *Dysport Myofascial Pain Study Group Efficacy and safety of a single botulinum type A toxin complex treatment (Dysport) for the relief of upper back myofascial pain syndrome: results from a randomized double-blind placebo-controlled multicentre study*. Pain, 2006. **125**(1-2): p. 82-88.
19. Qerama, E., et al., *A double-blind, controlled study of botulinum toxin A in chronic myofascial pain*. Neurology, 2006. **67**(2): p. 241-245.

20. Nicol, A.L., I.I. Wu, and F.M. Ferrante, *Botulinum toxin type a injections for cervical and shoulder girdle myofascial pain using an enriched protocol design*. *Anesthesia and analgesia*, 2014. **118**(6): p. 1326.
21. Kwanchuay, P., et al., *Efficacy and Safety of Single Botulinum Toxin Type A (Botox®) Injection for Relief of Upper Trapezius Myofascial Trigger Point: A Randomized, Double-Blind, Placebo-Controlled Study*. *Journal of the Medical Association of Thailand= Chotmaihet thangphaet*, 2015. **98**(12): p. 1231-1236.
22. Khalifeh, M., et al., *Botulinum toxin type A for the treatment of head and neck chronic myofascial pain syndrome: A systematic review and meta-analysis*. *The Journal of the American Dental Association*, 2016. **147**(12): p. 959-973. e1.

