

Dorsal Scapular Nerve Syndrome

Hans Boehnke, D.C. DIBAK

Abstract

Dorsal scapular nerve syndrome is characterized by symptoms of a generalized dull ache along the medial border of the scapula, radiating into the lateral surface of the arm and forearm. It is also characterized by weakness of the rhomboid and or levator scapulae muscles. It is frequent factor in shoulder dysfunction, which needs careful evaluation and treatment in the care of patients with shoulder complaints. An examination and treatment protocol is given that was used with success on a small sampling of 10 patients.

Key words: Dorsal Scapular Nerve, Nerve entrapment syndromes.

Introduction

The dorsal scapular nerve originates in the fifth cervical nerve root. It is found just proximal to the upper trunk of the brachial plexus. It pierces the scalenus medius muscle and passes posteriorly beneath the levator scapula, which it innervates and descends to innervate the rhomboid major and minor muscles.^{1,2,3}

Nerves may be compressed or angulated by adjacent tissues within the body. These tissues can be a boney callous, synovial thickening, ganglia, tumors, fibrous bands or normal or aberrant muscles. There can be an acute, a continuous, or an intermittent compression.⁵ The cases with which I have experience appear to fall into either the continuous or intermittent categories, mostly the intermittent. Abrams⁵ states the following regarding symptoms of Entrapment Neuropathy: “The symptoms of an entrapment neuropathy may be sensory, motor or both depending upon the fiber types involved in the affected nerves. Most clinical entrapments involve mixed nerves so both motor and sensory complaints are present. Sympathetic or parasympathetic dysfunction can occur if there is an involvement of autonomic fibers.”

The typical symptoms found in my experience are:

- Pain along the medial border of the scapula, radiating to the lateral surface of the arm and forearm.
- Complaints of shoulder pain and dysfunction, frequent thoracic outlet syndrome of the pectoralis minor syndrome type and weakness of various shoulder related functions.

I have found this syndrome to be a part of many shoulder dysfunctions and have found and treated it with many patients usually reducing their pain and dysfunction considerably.

Material and Methods

The symptoms of entrapment of the dorsal scapular nerve seen in my Chiropractic practice are usually those described by Walther.¹ They are as follows:

- Pain along the medial border of the scapula, radiating into the lateral surface of the arm and forearm. It is described as a generalized dull ache, characteristic of a motor nerve.

The etiology according to Walther¹ is as follows:

- Trauma to the scalene muscles caused by violent stretching such as cervical hyperextension-hyperflexion as in whiplash dynamics
- The entrapment is usually by the scalenus medius muscle
- Occupations that require overhead work, such as painters or electricians, make these individuals more susceptible to dorsal scapular nerve syndrome. In these cases the symptoms develop in association with the work position.

We must however; keep in mind that the entrapment can come from other etiologies as mentioned in the introduction, and if that is the case, the health professional doing the examination needs to make the appropriate referrals for the most effective care.

The examination for this syndrome, if caused by the scalenus muscle is as follows:

- If chronic, there may be atrophy of the rhomboid muscles and or the levator scapula.¹
- Winging of the vertebral border of the scapula away from the thorax and away from the spinous processes. This scapular winging is not as prominent as that found with a weakness of the serratus anterior.¹
- I have personally found that if I put my thumbs on the inferior angle of the scapulae bilaterally and have the patient abduct both arms as high as possible, that the inferior angle of the scapula on the affected side will travel farther laterally in the direction of the mid axillary line. This is made more dramatic if the patient puts their cervical spine into extension which would increase the entrapment in a case of a hypertonic medial scalene muscle on the involved side.
- The patient usually has a head forward posture, which may be accompanied by some lateral flexion and rotation of the neck in a posture that tends to relax the involved scalene muscles.¹
- An important sign, is marked tenderness over the lower two thirds of the scalene muscle.⁵ Pressure at this point can cause local pain and radiation, which can go to the scapular region and down the forearm.^{1, 5}
- Manual muscle testing may demonstrate a weak test of the involved rhomboid and or levator scapula muscle without provocation of the entrapment. In that case the muscle(s) can be returned to a normal test strength by changing the head and neck position to take strain off the dorsal scapular nerve. The most common position that takes strain off the dorsal scapular nerve is head and neck lateral flexion and rotation toward the side of involvement.¹
- If manual muscle testing does not demonstrate a weakness of the involved rhomboid and or levator scapula in the clear, then I have the patient extend and rotate the neck to a position that causes tension on the involved scalene muscle and retest the involved rhomboid and or levator scapula. It will usually now test weak. If other muscles also test weak in this position, then some other factor, such as the cervical spine and or reactive muscles, etc., can be involved and must be evaluated and treated appropriately.¹

Treatments that I have found effective in this syndrome are as follows:

- A manual muscle test is done to the scalene muscle involved and it is usually found to test strong. A stretch is done to the muscle by passively extending the neck to specifically stretch the medial scalene muscle on the involved side. The scalene muscle is then retested, and if it now tests weak, it indicates the either, a myofascial release, trigger point therapy, or percussion is the treatment of choice. The differential diagnosis and treatment for these is in Walther's textbook,⁶ pages 192–200.
- The myofascial release technique that I used when the findings indicated its need is a form of soft tissue manipulation, post isometric relaxation (a form of muscle energy technique), as well as proprioceptive neuromuscular facilitation (a form of therapeutic muscle stretching). These are described individually in detail by Hertling.⁹ When I do it I list it in my notes as MFR-PIR-PNF (myofascial release-post isometric relaxation-propriceptive neuromuscular facilitation). I first palpate gently over the scalene muscles to determine where the carotid artery is (it can be found by palpating its pulse). It is very important that this technique not be applied over the carotid artery or any artery so when I teach this I say IF IT PULSES LEAVE IT ALONE. The medial part of the scalene muscle is generally lateral to the carotid. I take a contact on the medial scalene in its upper aspect near C-2-3 approaching it from the lateral so that I can avoid the carotid and I have the patient gently flex their neck in the vector that isolates the medial scalene as much as possible. I then with my free hand take contact on their forehead and ask them to increase their flexion against my hand while I resist the movement. This is the isometric contraction part. I have them do this approximately 10 seconds which helps fatigue the hypertonic scalene muscle and then I ask them to relax as I stretch their neck into extension in a direction that lengthens the medial scalene as much as possible. This is the post isometric relaxation part. During this time I am doing a myofascial release using digital pressure on the scalene moving from superior to inferior. As I have them relax the scalene muscles I ask them to push their head back against my chest (as they are sitting and I am behind them), contracting the antagonist neck extensor muscles. This is the proprioceptive neuromuscular facilitation part. As my treating fingers go down on the scalene muscle I free up any adhesions felt and try to lengthen the fascia.
- If stretching the scalene muscles does not reveal any change in muscle function, I have the patient flex the neck to maximally contract the medial scalene muscles for 3 seconds. I then retest the muscle manually. If now a weak test is the result, it is an indication that strain and counterstrain technique is required, which would be to find a very tender point in the involved scalene muscle and to passively shorten the muscle in various vectors until a position is found that reduces the intensity of the tenderness by about 80–100%. The head, neck combination is held there passively for about 90 seconds or can be for 30 seconds if a deep phase of inspiration is maintained by the patient while the procedure is being applied while using digital pressure to pull apart the spindle cells. This is well described in Walther's Synopsis on pages 201–207.⁶
- Goodheart described what he called “The Fixation Vertebral Pattern” in 1973 in which he noted that when the left and right neck extensors test weak when tested individually and tested strong when tested bilaterally, it was frequently related to a sacral fixation.⁷ This was also described in Walther¹ pages 86–93. Walther in⁸ page 12–13 describes a tenet of Applied Kinesiology which is attributed to Goodheart in which muscle hypertonicity or spasm is frequently related to a functionally weak testing antagonist. I therefore test the neck extensor muscles bilaterally and individually to see if the pattern described is present. If so I treat the sacral fixation. This can be supplemented with exercises to keep improved sacral motion.

I tested a series of 10 patients for these various patterns and the results are listed in the appendix after the references.

Discussion

I have described an approach to the diagnosis and treatment of dorsal scapular nerve syndrome that has been very effective across many patients. I find this syndrome with a high frequency in my practice with those having shoulder complaints. Due to time constraints, etc., I have only documented a small series of 10 patients as a sample. Treatment modes for this syndrome may be refined and improved for this syndrome as more variations of diagnosis and treatment are discovered.

In my practice, I see many patients with shoulder pain and dysfunction. When I carefully examine and treat them, I realize that their dysfunctions are rarely from one cause and usually from numerous causes. For instance, as you can see in my case studies, all 10 of the patients in this small study showed a weak test of the infraspinatus and or supraspinatus only if the involved scapula was moved to an extreme position. According to Leaf¹⁰ and Walther¹¹ on his website description of the syndrome (<http://www.systemsdc.com/aktech/DSNerve2.html>) the unstable scapula caused by the weak testing rhomboid, and or anterior serratus (in cases where the long thoracic nerve of Bell is involved) causes the scapula to move excessively causing a stretching and or entrapment of the suprascapular nerve causing a weak testing infraspinatus and or supraspinatus. However, this suprascapular nerve syndrome is the topic for another paper and will not be discussed further at this time. What we can learn from this is that when we correct either the dorsal scapular nerve syndrome or a syndrome involving the long thoracic nerve of Bell, we can automatically improve the stabilization of the scapula and eliminate a frequent cause of the suprascapular nerve syndrome. This in turn can minimize straining of the supraspinatus and infraspinatus which are so often damaged in rotator cuff syndrome injuries.

Other factors such as an imbalance between the external rotator muscles and the internal rotator muscles, a slouched posture, and sometimes more remote factors such as sacroiliac joint dysfunctions, foot dysfunctions and or even temporomandibular joint dysfunctions can have an influence on shoulder pain. Cranial bone motion disturbances influencing cranial nerve #11, the spinal accessory nerve can affect the trapezius muscles and thereby influence scapular movement and shoulder pain. An unstable or misaligned acromioclavicular or sternoclavicular joint can affect the scapulohumeral movement and thereby abduction of the arm at the shoulder. We can also include individual muscle strains and ligament sprains and a poor diet that is pro-inflammatory, and we can see how complicated shoulder problems can be. These all must be considered in the treatment of the shoulder

Conclusion

The dorsal scapular nerve syndrome is a frequent syndrome that affects shoulder motion, pain, and even at least one other syndrome. This syndrome should be a primary consideration when treating patients with shoulder complaints. If we can address as many factors as possible causing shoulder joint dysfunction, we can hope to prevent the need for as many shoulder related surgeries and help patients to have an improved quality of life.

References

1. Walther, D.S., 1982 Selected Papers of the International College of Applied Kinesiology, (Detroit MI, International College of Applied Kinesiology 1982)
2. Tubbs, R. Shane, Tyler-Kabara, Elizabeth C., Aikens Alan C., Martin Justin P., Weed Leslie L., Salter E. George., and Oaks Jerry: Surgical Anatomy of the dorsal scapular nerve. J. Neurosurg. / Volume 102 / May 2005 pages 910–911.
3. Schimp, David J. The Symptomatic Upper Extremity: Journal of the American Chiropractic Association – May 1999.
4. Gentchos, Earnest J., Isolated Peripheral Nerve Lesions of the Brachial Plexus Affecting the Shoulder Joint. University of Pennsylvania Orthopedic Journal Volume 12 Spring, 1999.
5. Abrams, Bernard M. Entrapment and Compressive Neuropathies: Upper Extremity: Progress in Neurology.
6. Walther, David S., Applied Kinesiology Synopsis 2nd Edition pages 192-200. Privately published by Systems DC Pueblo Colorado 1988–2000. ISBN 0-929721-03-09
7. Goodheart, George, Jr., “The Fixation Vertebral Pattern” Digest of Chiropractic Economics, Vol. 16, No 1 (Detroit: Chiropractic News Publishing Co., Inc., July/August 1973).
8. Walther, David, S., Applied Kinesiology Volume 1 Basic Procedures and Muscle Testing, privately published by Systems DC, Pueblo Colorado 1981.
9. Hertling, D., Kessler, R. Management of Common Musculoskeletal Disorders- Physical Therapy Principles and Methods, third edition. Lippencott-Raven Publishers 1996 ISBN 0-397-55150-9 pages 116–118
10. Leaf, David Applied Kinesiology Flowchart Manual Third Edition EX-5 Privately published
11. Walther, David, S., Website description of nerve trauma and entrapments,
<http://www.systemsdc.com/aktech/NerveEndrap1.html> and dorsal scapular nerve syndrome
<http://www.systemsdc.com/aktech/DSNerve1.html> and suprascapular nerve syndrome
<http://www.systemsdc.com/aktech/SSNerve1.html>

Dorsal Scapular Nerve Syndrome Study

Patient name and number Date of the test	#1 Jan 7-08	#2 Jan 7-08	#3 Jan 7-08	#4 Jan8/08	#5 Jan7/08
Atrophy of rhomboid and or levator scapula	X	Slight	Slight	X	X
Winging of the vertebral border of the scapula From the thorax and spinous processes	√	√	√	√	√
Active abduction causes the inferior angle of the scapula to lateralize toward the mid axillary line	√	√	√	√	√
Head forward posture (may have lateral flexion and rotation to relax the scalene muscles.	√	√	√	√	√
Marked tenderness over the lower 2/3 of the Scalene muscles on the involved side	√	√	√	√	√
Pressure over the marked tenderness causes local pain and radiation which can go to the scapular region and down the forearm	√	√	X	√	√
Manual muscle testing revealed a weak test of the rhomboid and or levator scapula in the clear	X	X	X	X	X
Manual muscle testing revealed a weak test of The rhomboid and or levator scapula only when the neck is placed in a posture that causes increased tension on the hypertonic scalenes	√	√	√	√	√
Scalene muscles test strong initially but weak after being stretched	X	√	√	X	X
Scalene muscles test strong initially but weak after they are subjected to a maximal voluntary contraction of 3 seconds.	√	X	X	√	√
Neck extensor muscles test weak when tested individually but strong when tested together	√	√	√	√	X
Neck extensor muscles test weak only on the involved side.	X	X	X	X	X
Infraspinatus and or supraspinatus tests weak in the clear	X	X	X	X	X
Infraspinatus and or supraspinatus tests weak only if the scapula is placed in a position that makes it move excessively anteriorly	√	√	√	√	√

Dorsal Scapular Nerve Syndrome Study

Patient name and number Date of test	#6 Jan8/08	#7 Jan8/08	#8 Jan8/08	#9 Jan9/08	#10 Jan9/08
Atrophy of rhomboid and or levator scapula	X	X	X	X	X
Winging of the vertebral border of the scapula From the thorax and spinous processes	X	√	√	√	√
Active abduction causes the inferior angle of the scapula to lateralize toward the mid axillary line	√	√	√	√	√
Head forward posture (may have lateral flexion and rotation to relax the scalene muscles.	X	√	√	√	√
Marked tenderness over the lower 2/3 of the Scalene muscles on the involved side	√	√	√	√	√
Pressure over the marked tenderness causes local pain and radiation which can go to the scapular region and down the forearm	√	√	√	√	√
Manual muscle testing revealed a weak test of the rhomboid and or levator scapula in the clear	X	X	X	X	X
Manual muscle testing revealed a weak test of The rhomboid and or levator scapula only when the neck is placed in a posture that causes increased tension on the hypertonic scalenes	√	√	√	√	√
Scalene muscles test strong initially but weak after being stretched	X	X	X	√	√
Scalene muscles test strong initially but weak after they are subjected to a maximal voluntary contraction of 3 seconds.	√	√	√	X	X
Neck extensor muscles test weak when tested individually but strong when tested together	X	√	√	X	√
Neck extensor muscles test weak only on the involved side.	X	X	X	X	X
Infraspinatus and or supraspinatus tests weak in the clear	X	X	X	X	X
Infraspinatus and or supraspinatus tests weak only if the scapula is placed in a position that makes it move excessively anterior	√	√	√	√	√