

A Physical Therapist Perspective on Evaluation and Treatment for Cervical Radiculopathy

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Introduction

From time to time the physical therapist will evaluate and treat patients, referred by the orthopedist, with neck or cervical pain. Typically, these patients with neck pain will have a diagnosis of cervical radiculopathy with presenting symptoms that can be caused by several conditions such as disc herniation, cervical spondylosis, tumor, and trauma. Treatment results and outcome can be quite favorable in most patients that have been referred by an orthopedist or other physician, as far as my own experience (Mardel Grant, P.T.) has shown, and the best treatment available is subject to variable opinion as no specific, or best treatment has emerged according to a review of some of the articles on cervical radiculopathy. *Cervical radiculopathy is defined as irritation of nerve roots due to pressure/pinching/ impaction by a pathological structure causing pain and neurological symptoms and signs (such as motor weakness, atrophy of upper extremity muscles, sensory deficits).*

The patient with a complaint of neck and radiating upper extremity pain will look forward to evaluation and treatment by a skilled physical therapist. Wolf and Levine cited the works of Heckman et al and Radhakrishnan et al., which have indicated that people aged 50-54 were most affected by cervical radiculopathy with a rate of incidence of 83 per 100,000. ^(1,2,3) Approximately 10 years ago, I had a diagnosis of cervical radiculopathy, as a result of an awkward lift involving a heavy implement, as the mechanism of injury. This action placed strain on my cervical spine. As I worked through the physical rehabilitation independently with complete return of my functional ability, it has prompted me to share some information on this topic of cervical radiculopathy. Consequently, the purpose of this article to discuss the conservative management of cervical radiculopathy

Clinical Characteristics of Cervical radiculopathy

The patient that presents with cervical radiculopathy will quite often have a referred pain pattern from a specific nerve root level in the cervical spine, which may affect the dermatome and myotome of the affected upper extremity. The most common areas of referred pain pattern, after a review of selected articles, and discussion with master clinicians, and orthopedists, indicates that pathology at C5-6 and C6-7 regions of the cervical spine are the most areas of origin. These aforementioned regions are the most difficult to treat, in my opinion, secondary to the nature of the cervical spine posture, and disease process that affects biomechanical function. Muscle function is altered due to changes in the length-tension relationship of the global stabilizers and mobilizers of the cervical spine. The negative sequelae leads to further pain, dysfunction, and impaired mobility. One study reported that approximately 45% of working men will have at least one episode of neck discomfort, while upper limb pain will be present in 23%. And bilateral symptoms of neck and upper limb will be present in 51%. ⁽¹⁾ What I have observed over the years, especially in the acute stage of the condition, is that patients are unable to sit for a length of time, have difficulty sleeping, as well as using their arms for reaching and lifting. And in some of those cases that are quite recalcitrant, owing to incomplete rehabilitation. In these cases an

exacerbation of symptoms may occur (relapse) with the patient developing pain with possible chronic symptoms. Sometimes the patient indicates in the history that there are complaints of stiffness in neck upon awakening, and later there was pain into their arm with painful sensations that may descend distally into the wrist, hand, or fingers. Sometimes the specific reflexes are either absent or demonstrate less than normal active response. And even loss of muscle strength of the myotome that is involved may be observed. Cervical radiculopathy may be referred as a manual therapy lesion by those manual therapists who have found that their clinical findings often corroborate a specific motion restriction in the cervical spine that will be associated with pain and pathology. Often side bending, rotation, and backward bending to the same side will elicit symptoms into the shoulder and upper extremity. While at other times extension of the neck may elicit symptoms of pain.

Clinical pearls in the examination and treatment of the patient with cervical radiculopathy

What I have noted over the years working with orthopedists in clinical practice is that one treatment approach does not necessarily help in remediation of the patients signs and symptoms, and that ultimately an eclectic approach to care may serve the patient quite well, with our ultimate goal being to have the patient be pain free and have good functional mobility and strength. The clinical pearls that I have used in this article have demonstrated an 85% or better success rate clinically. Empirically the results have been very favorable. I also think that using these clinical pearls will encourage a more differential diagnosis process as you do your evaluation.

An elevation of the first rib, giving rise to referral pain pattern that mimics supraspinatus shoulder pain with a reference zone to the lateral forearm region may be noted. Consequently during the examination an assessment of rib function as well as palpatory exam is useful. With the application of manual therapy to the first rib these symptoms of ache, and pain often extending down the arm and over the lateral epicondyle of the elbow into the forearm will minimize substantially, which could be misconstrued as a cervical radiculopathy type of problem. It is rare that pain is referred to the wrist from the supraspinatus. The epicondylar component of pain distinguishes the supraspinatus from infraspinatus which is not referred to the elbow. ⁽⁴⁾

Another very good clinical pearl on muscle testing is to note the size, power, tone, and volume of the shoulder muscles as they are tested.

The patient with radicular symptoms, coming from the cervical spine, may not be able to sustain the muscle contraction desirable for any number of reasons, including muscle weakness, feigning, fear avoidance behavior, and anxiety, especially if the patient has too much pain. Also during the examination note the sitting posture of the patient presenting with cervical radiculopathy. If it is true radicular pain the patient may support the extremity with the opposite hand. They may often be observed, in subtle form, to lean into or away from the painful side of origin. Leaning into the side of pain may reduce tension on the selected nerve root, or the patient may lean gently lean away from the painful side in order to stretch the affected muscles of the neck, particularly the upper trapezius.

Another clinical pearl often confronting the clinician is the inability to complete an examination secondary to the patient's pain level, fear, and being unable to tolerate testing. In the situation involving the patient's inability to complete the testing on the first evaluation by the physical therapist, a second evaluation should be set up with added time provided to complete the testing and measurements as well as time to set up a treatment plan.

The deltoid muscle, often a dull actor as referred to by Janet Travell in her works, can sometimes refer pain into adjacent areas of the of the arm which is not radicular in origin. Patients with cervical radiculopathy may have a weak and painful grip secondary to pain originating proximally. This latter complaint could be confused with a painful weak grip associated with hand extensor and brachioradialis muscle groups. As we recall the brachioradialis attaches above the elbow on the shaft of the humerus and to the styloid process radial side of forearm, while the hand extensors attach to the lateral epicondyle of the elbow and onto the various carpal bones of the wrist. Trigger points and tender areas will often be noted in these muscles and must not be confused with a radicular pattern in the upper extremity. The key in the palpation exam is radicular pain will have specific sites in the dermatome that will be affected, while tenderness from a trigger point will have much more localized tenderness.

An often neglected clinical pearl is the pectoralis minor muscle that demonstrates a referred pain pattern to the anterior chest, anterior deltoid, and medial arm extending caudally to the fingers innervated by C7 and T 1 dermatomes. The entrappers, referred to as the scalene muscles will clinically have trigger points and pain pattern over upper trapezius, posterior arm, dorsolateral forearm to the web space of the thumb and index finger. Examination of these muscles is imperative in the patient presenting with signs and symptoms of cervical radiculopathy. In addition being alert to the fact that periods of myofascial pain may be associated with what the patient calls numbness of the thumb without hypesthesia to cold or touch(4).

Palpation of specific landmarks of the neck and throat region are also very important to perform as each level anteriorly will correlate to posterior neck levels. If you are not sure which level is affected, and your thought process correlates to a specific level of involvement of the cervical spine, have the patient in supine. By careful palpation of the ramus of the mandible C1-C2, hyoid bone C3, thyroid cartilage C4-5, first cricoid ring C6, second cricoid ring C7 you are able to establish specific landmarks.⁽⁶⁾

Thoughts on the use of cervical traction for patients having cervical radiculopathy

Often the patient presenting with pain, muscle guarding and referred pain may benefit from the application of ice, and electrical stimulation for comfort measures. Once we have the pain and guarding under control we may add cervical traction, slowly with attention to appropriate poundage. Appropriate traction would range from 8-10 pounds initially for 3-5 minutes. And be slow to increase traction pounds if the joint is irritable, otherwise be quick to increase the duration and then the weight

if you don't see adequate improvement being maintained. ⁽⁵⁾ Position, time and poundage may have to be increased or decreased depending upon the patient's neck volume and ability to tolerate the supine position. The use of positional mechanical traction is an excellent treatment, and one which will nearly always achieve results. An example of positional cervical mechanical traction would be having the patient supine with left side-bending with slight right rotation and flexion for reduction of pain.

Case Report

A 50 year old male industrial worker was referred to PT services on 1.12.11 with a diagnosis of right sided cervical radiculopathy. The mechanism of injury involved performing a heavy power clean lift with a barbell. The patient was an avid weight lifter and used weight training to keep in shape. The patient remembered awkwardly extending his neck backward as he successfully cleaned this heavy barbell, however several days later he noted pain at night during sleeping, right upper extremity pain and numbness and weakness in the area of the C6-7 nerve root and complaint of referred pain down his arm in the form of tingling and paresthesia. He went to see his primary care provider and diagnosed with right cervical radiculopathy. The physician ordered a roentgenograms of the cervical spine, with the results demonstrated facet hypertrophy and cervical spondylosis at bilateral levels of the C5-6-7 regions of the spine. The patient was placed on pain medication for sleep and was given a prescription to be evaluated by a physical therapist. The patient was seen for PT evaluation on 1.15.11 with evaluation results showing a positive right sided neck pain, with the pain referred to the C-5-6 dermatome of the right forearm and hand, and weakness of the right grip and bicep. The patient was started on gentle but progressive cervical intermittent traction over the next 10 days along with electrical stimulation and moist heat to calm muscle spasm. The patient had a 7-8/10 for pain on the initial PT evaluation, slight weakness of the right biceps muscles and dampened reflexes for the right bicep and brachioradialis reflexes. The patient had previously injured his back the previous year in lifting a heavy box while working in his local factory, but was able to respond favorably to a home exercise program and medication. Other pertinent medical history revealed having a colonoscopy, rotator cuff repair, and surgery for a torn Achilles tendon sustained in a softball game through his local church, for which he had received PT 2 years previously. He was able to return to church softball. For his present condition of cervical radiculopathy, the patient would receive physical therapy consisting of home exercise program and manual therapy for the cervical spine along with stretching and stabilization work to the same region of his spine. Initial scores for the Neck Disability Index were 30 out of 50 with the higher score indicating more dysfunction. Due to the pain and interruption of sleep, and a period of 2 weeks in which the patient did not progress, an EMG was ordered that demonstrated decreased conduction of the C5-6 dermatome and myotome of the right hand as this correlated to the patient's complaint of pain to the posterior thumb and index finger as well as the anterior and lateral deltoid, arm and forearm of the involved extremity. He also had some muscle weakness of the R biceps and slightly diminished biceps reflex for the Right elbow. Clinical goals for this patient would be to have him return to work without symptoms of neck or right arm pain, improve strength to 5/5 for the right biceps, perform an independent home exercise program, and improve the NDI score at least 70% or more. Over the course of 15 visits the patient improved his Neck Disability Index to 10 out of 50, gain

the required muscle strength of 5/5 in the right upper and strength, return his grip strength to the 85th percentile for his age group and return to work on his regular shift.

Conclusions

Cervical radiculopathy can be a challenging clinical condition to treat for medical doctors and physical therapists. The orthopedist is uniquely qualified to refer those patients with complaints of cervical radiculopathy for appropriate physical therapy care. The more recalcitrant cases of cervical radiculopathy should also be treated by a skilled physical therapist or manual therapist. As the patient would benefit from an eclectic approach to care involving appropriate use of cervical stretching, manual therapy, home exercise program, stretching, medication, review of work tolerance, and the use of any other studies such as EMG, x-ray, and MRI if need be to return the patient to a functional lifestyle prior to the chief complaint.

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