

Cervical Radiculopathy

Anatomy and Biomechanics

The neck or cervical spine is comprised of seven vertebral bones stacked in a column which support the head. In between each of the vertebrae is an intervertebral disc. The spinal cord travels down inside of the cervical spine in a bony cage. Arising from each vertebral level on each side of the cord are nerve roots which exit out through holes in the cage and travel down to the neck, upper back, and arms. These small holes through which the nerves exit are called foramen. The ceiling of each hole is made by the vertebrae above and the floor of the hole is made by the vertebrae below.

Cervical radiculopathy is a painful condition in which a nerve becomes pinched as it leaves the spinal cord. The pinched nerve is compressed by either herniated disc material or by degenerative bony spurs arising from the neck.¹ The nerves travel into your neck, upper back and arms, and can refer symptoms into these areas. Symptoms experienced can be pain, numbness, tingling, weakness or a combination of these.



<http://www.deuksoine.com/bases/pinched-nerves>

Treatment Options

Effective treatment of radiculopathy begins with a thorough examination to determine the root cause of the dysfunction. Once the exam and diagnostic process is complete your physician will work with you to determine the most appropriate course of action for treatment. In most cases cervical radiculopathy is first treated conservatively. This may include rest, anti-inflammatory medication, and activity modification. Your doctor may refer you to physical therapy to work on reducing the compression and inflammation of the nerves in your neck.



If the pain in your neck and arm does not resolve with these conservative measures your doctor may recommend you to have an injection of anti-inflammatory medication (cortisone) directly into the region of nerve compression. This space is often referred to as the epidural space and the injection is sometimes referred to as an “epidural” injection. This can be a very effective treatment for reducing the inflammation enough to allow physical therapy treatment to work effectively.

<http://www.cervicalspinehelp.com/what-is-cervical-radiculopathy/>

In some instances cervical radiculopathy is resistant to all forms of conservative treatment. In these cases you and your doctor may decide that surgical management of the pain is the best option. This procedure may include removal of the herniated disc material or bone spur to free the nerve from the compression. Prior to undergoing surgery your doctor will discuss the procedure and recovery process in detail.

Rehabilitation Philosophy

The goals of physical therapy are to reduce the nerve compression, decrease pain, and restore function. Currently the best approach to treatment involves multiple treatment strategies. Manual and/or mechanical traction may be applied to your neck to unload the compressed nerve. Different modalities utilizing heat or electrical stimulation may be used to reduce pain and decrease muscle guarding. Hands-on manual techniques will be employed to loosen stiff neck and upper back joints and muscles to help to maximize flexibility.² Restoring strength to the deep stabilizing muscles in the front of your neck and between your shoulder blades will improve your postural endurance which is needed to avoid future aggravation of the nerve.³

Rehabilitation

****The following is an outlined progression for rehab. Advancement from phase to phase as well as specific exercises performed should be based on each individual patient's case and sound clinical judgment by the rehab professional. ****

Phase 1: ACUTE PHASE

Goals

- Reduce pain and inflammation
- Protect injured nerve and cervical spine
- Improve cervical range of motion (ROM) without an increase in radicular symptoms
- Improve thoracic ROM
- Improve posture

Recommended Exercises

ROM

- Active cervical ROM within a pain-free range
- Active thoracic ROM
- Scapular retraction exercises
- Pectoral stretches
- Length wise foam roller use with head supported

*Perform ROM exercises gently with the goal of reducing muscle guarding and pain

If tolerated, deep neck flexor muscle activation is to be initiated

Guidelines for Progression

Before progressing to the subacute phase the neck and radiating symptoms should be less painful at rest and with movement. Increased pain with passive ROM should be seen more at “end range” and less with initiation of movement. Deep neck flexor activation should be achieved. The patient should have a good knowledge of postural correction techniques and activities that alleviate symptoms.

Phase 2: SUBACUTE PHASE

Goals

- Continued protection of injured/healing tissue
- Increased passive and active ROM in the cervical and thoracic spines
- Increased strength of cervical and periscapular musculature endurance with longer duration holds
- Decrease axial symptoms
- Abolish radicular symptoms

Precautions

Avoid any activity or exercise that reproduces radicular symptoms.

Recommended Exercises

ROM

- Active cervical ROM working toward end range
- Active thoracic ROM working toward end range
- Scapular retraction exercises with resistance
- Pectoral stretches
- Continue lying over a foam roller with head supported

Strengthening: (low resistance and long duration holds)

- Deep neck flexors
- Neck extensor strengthening

Guidelines for Progression

- Resolution of radicular symptoms
- Mild axial cervical pain may remain
- The patient should have gained a majority of their available ROM back
- Good tolerance for strengthening
- (-) Spurlings test
- (-) ULTT

Phase 3: REHAB PHASE

Goals

- Continue to acquire normal ROM if still deficient
- Progressively continue to strengthen peri-scapular muscle groups with increased resistance
- Restore functional use of arm and neck

Precautions

Avoid any activity or exercise that reproduces radicular symptoms.

Recommended Exercises

ROM

- Stretches to cervical spine musculature
- Continue with thoracic mobility exercises
- Continue with pectoral stretching

Strengthening (Theraband or Dumbbell)

- "T," "Y," and "I" progression (shoulder extension/ horizontal abduction/scaption)
- Cervical isometrics in all planes

Guidelines for Progression

Before progressing to the sports specific phase the cervical spine should be pain free in all planes of motion and strength should be very good. Neck and arm symptoms should be gone.

Phase 4: SPORT SPECIFIC PHASE

Goals

- Restore normal ROM and strength
- Continue to encourage cervical spine use for functional activity and return to sport

Limitations

Encourage slow progression back to sport and high level activity

Work with orthopedic doctor or physical therapist regarding specific plan for return to sport/activity

Recommended Exercises

ROM and Stretching

Continue with phase two and three exercises as directed by physical therapist

Strengthening

Continue with phase three strengthening 2-3 times a week.

Work with physical therapist to determine which exercises should be continued

Guidelines for Return to Activity

Work with physician or physical therapist for specific plan for return to sport and activity. Step by step progressions should allow for gradual return to high level activities.

Phase	Focus	Range of Motion	Recommended Exercises	Precautions
Acute	<ul style="list-style-type: none">*Reduce pain and inflammation*Protect injured nerve*Improve cervical ROM without radicular symptoms*Manual therapy to increase joint mobility in the cervical and thoracic spines*Traction*Postural correction and retraining	<ul style="list-style-type: none">*Gentle pain-free cervical ROM*Pain-free thoracic ROM progression	<p><u>ROM</u></p> <ul style="list-style-type: none">▪Active cervical ROM within a pain-free range▪Active thoracic ROM▪Scapular retraction exercises▪Lying over a foam roller with head supported <p><u>Strengthening</u></p> <ul style="list-style-type: none">▪If tolerated, deep neck flexor strengthening should be initiated	<ul style="list-style-type: none">* Avoid any activity or exercise that reproduces radicular symptoms.

Subacute	<ul style="list-style-type: none"> *Reduce pain and inflammation * Protect injured nerve *Improve cervical ROM without radicular symptoms *Improve thoracic ROM 	<ul style="list-style-type: none"> *Continue to progress cervical ROM * Continue to progress thoracic ROM 	<p><u>ROM</u></p> <ul style="list-style-type: none"> ▪Continue active cervical ROM within a pain-free range ▪Continue active thoracic ROM ▪Pectoral stretches ▪Scapular retraction exercises ▪Lying over a foam roller with head supported ▪If tolerated, deep neck flexor strengthening should be initiated <p><u>Strengthening</u></p> <ul style="list-style-type: none"> ▪Progression of deep neck flexor strengthening <ul style="list-style-type: none"> ▪Progression of neck extensor strengthening ▪Strengthening of periscapular muscles and thoracic extensors 	<ul style="list-style-type: none"> * Avoid any activity or exercise that reproduces radicular symptoms.
Rehab	<ul style="list-style-type: none"> * Restore full pain free strength and ROM to cervical and thoracic spines *Functional endurance training 	<ul style="list-style-type: none"> *Stretches to cervical musculature 	<p><u>ROM</u></p> <ul style="list-style-type: none"> ▪Cervical spine muscle stretches <p><u>Strengthening</u></p> <ul style="list-style-type: none"> ▪Global neck strengthening ▪ Strengthening of periscapular muscles and thoracic extensors 	<ul style="list-style-type: none"> * Avoid any activity or exercise that reproduces radicular symptoms.
Sport Specific	<ul style="list-style-type: none"> Gradual Return to Sports and Physical Activity 	<ul style="list-style-type: none"> Maintain Full Passive/Active ROM 	<p><u>ROM</u></p> <ul style="list-style-type: none"> ▪Continue as Needed <p><u>Strengthening</u></p> <ul style="list-style-type: none"> ▪Continue T-band and Peri-scapular Progressions 3 x/ Week as Needed <p><u>Dynamic Progressions</u></p> <ul style="list-style-type: none"> ▪Continue Proprioceptive Drills During Return to Sport 2-3 x/ Week 	<ul style="list-style-type: none"> *Return to Sports and Physical Activity per Surgeon/Physical Therapist Evaluation *Achieve Full Pain Free ROM and Excellent Strength Before Progression Back to Sport

*Reviewed by Michael Geary, MD

References

1. Eubanks JD. Cervical radiculopathy: Nonoperative management of neck pain and radicular symptoms. *American Family Physician*. 2010; 81(1):33-40.
2. Boyles R, Toy P, Mellon J, Hayes M, Hammer B. Effectiveness of manual physical therapy in treatment of cervical radiculopathy: a systematic review. *Journal of Manual & Manipulative Therapy*. 2011; 19(3):135-142.
3. Cleland JA, Fritz JM, Whitman JM, Heath R. Predictors of short-term outcome in people with a clinical diagnosis of cervical radiculopathy. *Phys Ther*. 2007; 87(12):1619-1632.