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# Clinical Assessment of Cervical Spine: Tips and Tricks

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## Introduction

Literature reviews combined with our personal experience in examination of ≥10000 (ten thousand) patients with neck pain or LBP among the last 10 years were used to propose some tips and trikes to be considered when evaluating such patients. Neck pain affects approximately 10% of the adult population at any given time. Even in the era of high-quality imaging studies, a history and physical examination remain the cornerstone of the profession and should never be discounted [1-3].

### There are two main pathologies

**Cervical Radiculopathy:** which is a functional disturbance of spinal nerve root. Presented mainly by neck and upper limb radicular pain [4].

**Cervical Myelopathy:** which is a functional disturbance of the spinal cord Gait changes. presented by Bowel (18%) dysfunction, Bladder (15%) dysfunction, Simultaneous LL changes, Sensory OR Motor Diffuse Hyperreflexia, Upper motor neuron changes; sometimes without neck or arm pain (20%) [4,5].

To help determine the source of pathology and whether any additional imaging is needed, a variety of unique physical examination tests can be used. Cervical radiculopathy is often evaluated by many provocative tests; the Spurling test is one of the most used provocative tests. The Spurling test was originally named as Spurling's neck compression test by the neurosurgeons Roy Glen Spurling and William Beecher Scoville. It was proposed in 1944 for use in the evaluation of "radiculitis." It has been referred as the Foraminal Compression Test, Neck Compression Test, or Quadrant Test.

The Spurling test is considered a provocative test used in the spinal examination [2]. In several previous trials (mostly conducted in the late 1900's), the test had proven to have high specificity, but low sensitivity [6,7]. Due to its relatively low sensitivity, the Spurling test should not be used as the sole screening tool. To increase overall screening sensitivity, it is best used along with other specialized examination tests (some of which are listed below) and should always be accompanied by an extensive patient history [8]. Cervical Myelopathy (DCM) is the most common form of spinal cord impairment in adults and results in disability and reduced quality of life. DCM can present with a wide set of clinical and imaging findings, including: 1) pain and reduced range of motion of the neck, and motor and sensory deficits on clinical exam, and 2) cord compression due to static and dynamic injury mechanisms resulting from degenerative changes of the bone, ligaments, and intervertebral discs on MRI. The incidence and prevalence of DCM has been estimated at a minimum of 4.1 and 60.5 per 100,000, respectively. The diagnosis of DCM is based on clinical examination, with a positive Hoffmann's sign and hand numbness typically appearing in the upper limbs, and gait abnormalities such as difficulty with pushbike gait serving as sensitive diagnostic findings. Loss of bladder function may also occur in patients with severe DCM [9].

### Cervical Canal dimensions [10]

17 mm (13 – 20 mm) midsagittal diameter.

< 13 mm considered congenital stenosis.

### Cord dimensions [10]

45 cm long in ♂

43 cm long in ♀.

13 mm thick in cervical and lumbar regions ,6.4 mm in thoracic area.

As C1 exits between occiput & C1 body, C1-C7Cervical nerve roots exit above corresponding vertebral body However C8 exits below C7.

### Epidemiology of cervical radiculopathy [3]

Peak 4th & 5th decades

### Prevalence in males

Age 40, 13%

Age 70, 100%

### Prevalence in females

- Age 40, 5%
- Age 70, 96%
- 30% asymptomatic individuals over 30 years old will have degenerative changes
- 70% by age of 70th will have degenerative changes on x-ray
- Cervical Spondylotic myelopathy is the most common cause of spastic paraparesis or quadriparesis.
- C6 & C7 nerve roots are most affected

### Clinical Presentation [11]

### History of:-

- Radiating arm pain
- Sensory loss
- Motor deficits
- Reflex changes
- Disc herniation after
  - Trauma
  - Repetitive activity
  - Awaken at night
- Dermatomal distribution of severe, agonizing, burning, tooth-ache quality pain.

### Physical Examination [12]

i. Sensation,

ii. Palpation,

iii. Range of motion,

iv. Motor strength,

v. 5-Deep tendon reflexes.

### Some Radiculopathy Provocative Tests [12,13]

a. Spurling's Neck Compression test

b. Arm abduction test

c. Axial manual traction test

d. Shoulder depression test

e. Lhermitte's sign

f. Jackson's test

g. Hamoud's Compression tests

h. Scalene cramp test

i. Naffziger's test

j. Vertebral Artery Test

### Myelopathy Provocative Tests [14-16]

i. Hoffman's Reflex

ii. Hamoud's Tap on the Tip Reflex.

iii. Inverted Radial Reflex

iv. Grip & Release Test

v. Finger Escape Sign.

## Spurling's Neck Compression test

**Procedure:** Sitting Position

1st Phase: compress with head in neutral position

2nd Phase: compress with head extended

3rd Phase: compression with head extended and rotated to the affected side.

+ve sign: Pain radiates to arm toward which head is rotated

Significance: Cervical Nerve Root Compression

### Arm Abduction Test

Procedure: Sitting Position

Abduct patients arm then rest hand or forearm on top of the head.

+ve sign: relief of symptoms

Significance: Nerve Root Compression.

### Axial manual traction test

Procedure: Sitting Position

Place one hand under the patient's chin and the other around the occiput.

Slowly lift the head, applying traction to the cervical spine.

+ve sign: relief of Pain

Significance: Nerve Roots Compression.

### Shoulder Depression Test

Procedure: Sitting Position

Side flex patient's head on unaffected side then apply a downward pressure on the affected side. +ve sign: increase pain

Significance: Nerve Root Compression

### Lhermitte's Sign

Procedure: Sitting Position

Flex the patient's head and one hip simultaneously with the


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leg kept straight.

+ve sign: Electric-like sensation radiating down spine and/or extremities

Significance: Dural or Meningeal Irritation

### Jackson's Test

Procedure: Sitting Position

Rotates patient's head to the affected side and apply a downward pressure on the head. +ve sign: Pain Radiates into the arm

Significance: Cervical Nerve Root Compression

### Hamoud's Test [17,18]

Procedure: Sitting Position

A-Apply a gentile simultaneous compression to the supraclavicular foci of the affected and non-affected side by pulp of the thumb.

+ve sign: pain radiates into the shoulder OR sever tenderness

Significance: Plexopathy / Thoracic Outlet Syndrome

B- Apply a gentile simultaneous rolling one inch below to the lateral epicondyles of the affected side and non-affected side by pulp of the thumb.

+ve sign: Sever tenderness on the affected side.

C- Apply a simultaneous firm stretching to extensor and abductor hallucis longus of the affected and non-affected side.

+ve sign: Sever tenderness on the affected side.

### Scalene Cramp Test

Procedure: Sitting Position

Patient actively rotates the head to the affected side and pulls chin down into the supraclavicular fossa by flexing the cervical spine.

(+ve) sign: increase pain.

Significance: Plexopathy / Thoracic Outlet Syndrome.

### Naffziger's Test

Procedure: Sitting Position

Compress patient's jugular veins for 30 seconds then ask the patient to cough.

(+ve) sign: Pain

Significance: Nerve Root problem or Space Occupying Lesion.

### Vertebral Artery Test

Procedure: Supine Position

Move patient's head out then neck extension and side flexion.

Rotate patient's head to the affected side and hold for 30 seconds.

(+ve) sign: Dizziness / Nystagmus

Significance: Compression of Vertebral Arteries.

### Hoffman's Reflex [17,18]

Procedure: Sitting Position

Suddenly extend middle finger distal interphalangeal joint.

(+ve) sign: Reflex flexion of the other fingers.

Significance: indicative spinal cord impingement.

### Hamoud's Reflex

Procedure: Sitting Position

Suddenly tap on the tip of middle finger.

(+ve) sign: Reflex flexion of the other fingers.

Significance: indicative spinal cord impingement.

### Inverted Radial Reflex

Procedure: Sitting Position

Tapping of distal brachioradialis tendon.

(+ve) sign: Spastic contraction of Finger Flexors.

Significance: indicative spinal cord impingement.

### 14- Grip & Release Test

Procedure: Sitting Position

Form fist and extend fingers rapidly Repeat 20x /10 seconds.

(+ve) sign: This not only becomes slower but, in advanced cases, exaggerated wrist extension occurs with finger flexion and exaggerated wrist flexion occurs with attempted finger extension. Significance: indicative spinal cord impingement.

### Finger Escape Sign

Procedure: Sitting Position

Hold fingers adducted and extended.

(+ve) sign: Small & ring fingers fall into flexion abduction, within 30 seconds.

Significance: Indicative spinal cord impingement.

## Conclusion

In most patients with cervical radiculopathy, Spurling's Neck Compression, Arm Abduction, Axial Manual Traction, and Hamoud's tests provokes pain, thus offering an easy, rapid, applicable and reliable clinical test for diagnosing such condition. Considering its sensitivity and predictive values, it may be the "fundamental tests" for the clinical assessment this condition in daily practice.


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