



An Evidence-Based Approach to the Neck Assessment

ABSTRACT

Neck pain is a common musculoskeletal condition that frequently resolves spontaneously or with conservative treatment and only occasionally requires surgical intervention. The purpose of the neck examination is to determine if the etiology is neurological or mechanical pain, which determines treatment planning, and then to rule out red flags. There is good evidence that on examination clinicians cannot reliably differentiate specific anatomical structures but they should still perform a focused clinical examination to locate typical pain on movement and establish the neurological status. Base treatment on exercise, activity management and pain control.

KEYWORDS: Neck, Examination, Treatment, Differential Diagnosis



CME

Pre-test Quiz



Background

Neck pain is a common problem in primary care with an estimated one-year incidence ranging from 10-21% and is one of the top five chronic pain conditions worldwide.¹ Most acute episodes will resolve spontaneously but there is a 25-50% recurrent rate with patients complaining of low-grade symptoms producing both personal and socioeconomic burdens.

Guidelines have never included a specific approach to assessing the neck although treatment recommendations do advise non-pharmacological and pharmacological management for optimal results. The diagnosis of mechanical neck pain is seldom determined by an evidence-based physical examination and instead is often based on subjective conclusions and putative pathology. The 2010 Bone and Joint



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Decade task force on neck-associated disorders found the interrater reliability of determining head posture, manual palpation and visual range of motion were inconsistent and not deemed reliable diagnostic maneuvers.² In research trials, external devices often used to quantify the estimation of range in assessing cervical mobility have little clinical impact. There is little evidence to support the use of clinical tests to evaluate pain location and cervical mobility.³ Current literature supports a thorough history to exclude red flags, a clear neurological examination to determine differential diagnosis and a neck examination for treatment planning purposes.⁴

The lack of a clear diagnosis adds unwarranted concern about sinister pathology and drives unnecessary investigation and specialist referral even though the source of pain in the cervical spine is overwhelmingly mechanical and not associated with any serious pathology. Since minimal mechanical irritation is required to cause pain, locating the exact location of the problem may be impossible. But if no invasive intervention is required, there is no need to unequivocally identify the pain generator. The choice of the initial treatment is not determined by the presumed pathology but by the patient's symptoms, which then direct management.

Differential Diagnosis of Neck Pain: How much should we worry?

While the differential diagnosis for neck pain is broad and includes etiologies such as inflammation, infection, trauma, neoplasm, endocrine disorders and vascular problems they are all uncommon.⁵ Until proven otherwise, neck pain is the result of a benign mechanical malfunction. Developing a logical approach to assessing red flags will assist the clinician in eliminating serious pathologies while evaluating neck pain and function. The clinical history should identify risk factors for serious pathology including unexplained weight loss, significant global neck rigidity, prolonged morning neck stiffness, balance and gait disturbance and a history of co-morbidities. In patients under 20 years of age, it is important to identify congenital abnormalities that may be associated with structural changes to the bones or discs. There may be physical signs related to such an underlying abnormality such as altered hair distribution, skin tags or neck birthmarks. With early onset neck pain associated with prolonged morning neck stiffness of greater than 30 minutes, ask about a family history of systemic inflammatory disease. In patient's over 50 years, always inquire about a history of cancer, vascular disease, unstable hypertension and any alteration in gait, balance or bladder function. Red flags identified



in the history or physical examination, demand further investigation. A mnemonic for remembering potential sinister pathologies is NIFTI: Neurological, Infection, Fracture, Tumour, Inflammation.⁵ Cardiovascular pathology such as myocardial ischemia or carotid arterial dissection can present as neck and shoulder pain.

Key Point

If your patient is presenting with symptoms of systemic disease, deteriorating neurological status or focal severe pain, initiate further investigations and or referral.

Examining the Cervical Spine

A common approach to examining the neck is using provocation tests that elicit the typical neck pain symptoms. . The history can suggest probable structural etiology and the physical examination can confirm or refute the diagnosis. Although many cervical spine clinical tests lack inter-rater reliability and have sub-optimal sensitivity and specificity, this approach does provide a logical review of the neck structures to guide treatment decision-making. The neck physical examination can be divided into neurological or mechanical pain. The examination consists of soft

Table 1: Red Flags for Neck Pain indicating further investigation is required
Clinical Pearl

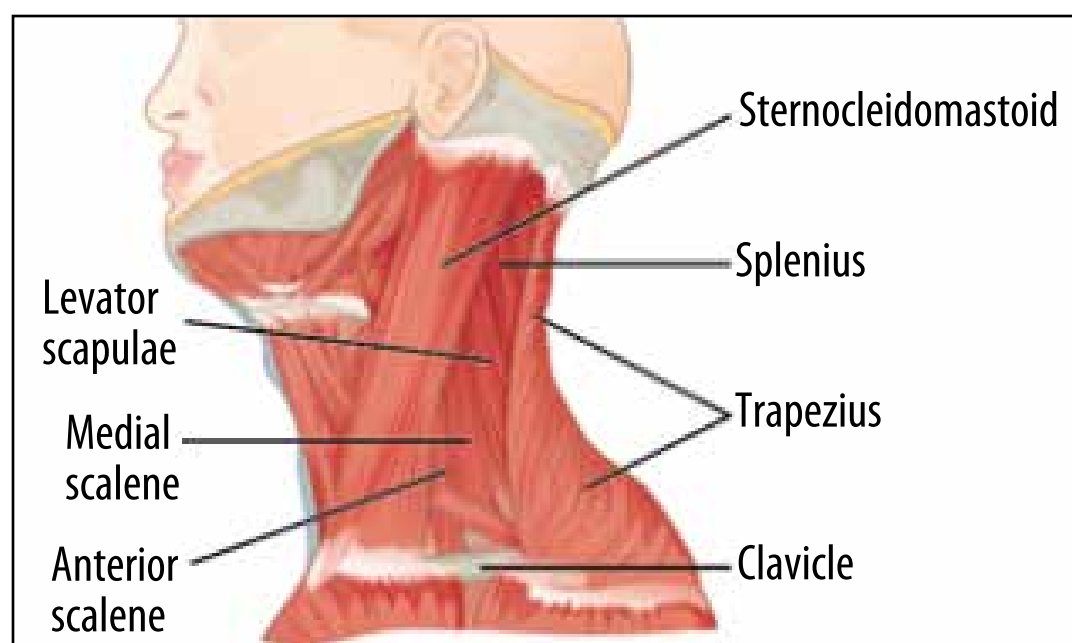
History

- Congenital Abnormalities (altered hair distribution)
- Family History of Inflammatory disease
- Personal History of Cancer or Recent Trauma
- Current Vascular disease, Dizziness or Drop Attack
- Unexplained fever, weight loss, vomiting
- Severe Headache
- Loss of Bladder or Bowel control
- Constant pain, awakes from sleep

Physical

- Unstable High Blood Pressure
- Worsening Torticollis or Significant limitation of neck mobility
- Severe neck tenderness
- Joint Erythema or exudate
- Visual loss, Photophobia or phonophobia
- Positive Upper Motor Neuron Sign (Babinski, Clonus, Hoffmann's)
- Abnormal neurological examination (hyper-reflexia, spasticity, myotomal or dermatomal loss)





tissue testing and range of motion to support a mechanical diagnosis and neurological testing to support a neurological pain diagnosis.

Key Point

Once red flags have been ruled out, neck pain will fall into two categories: neurological or mechanical pain.

Soft Tissue

The soft tissue includes muscles, ligaments and fascia. Soft tissue pain is very common and can occur independently or appear concurrently with underlying bony or neurological pathology. The muscles of the neck extend from the ear to the clavicle laterally and over the anterior and posterior compartments. The sternocleidomastoid is a superficial large stabilizing muscle prone to stress from poor posture, repetitive occupational use or trauma. The deeper scalene muscles hold the neck uprights and are susceptible to deconditioning. The trapezius muscle lies over the

posterior neck and suprascapular area and frequently exhibits tension and trigger points. Soft tissue pain is commonly described as having a gradual onset with discomfort in the neck, trapezius ridge and interscapular area associated with movement or prolonged position. There are no neurological abnormalities. Muscle guarding producing pain and tightness may occur restricting the active range of motion. Typically, the passive range of motion is full and pain free except for some stretch discomfort at the end of range. Isometric strength testing is not clinically useful and inhibited by guarding and discomfort. A functional history related to posture, movement and activity causing intermittent pain and discomfort is a more reliable sign.⁶

Palpation of the soft tissue produces only subjective sensations and is not diagnostic. Palpation may increase the patient's pain, interfering with the interpretation of the remaining examination. It is best left until the end and utilized as a means of producing subjective symptoms for treatment planning.

Range of Motion

Normal range of motion in the cervical spine is approximately 80° to 90° of flexion, 70° of extension, 20° to 45° of lateral flexion, and up to 90° of rotation. Range of motion is assessed actively in three planes; flexion-extension, rotation and

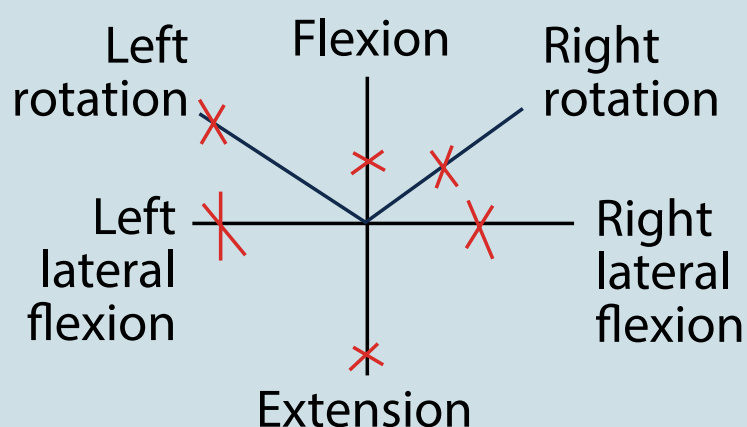


side flexion to determine the effect of movement on the typical pain. Initially the degree of movement is not as useful as the associated production of pain but range may be recorded to demonstrate progress on follow-up. Significant restriction in all directions may be related to a non-mechanical pathology. Inter-rater reliability studies using standardized protocols for assessing cervical movement are highly variable indicating that range of motion is best used to categorize injury type or plan treatment protocols.³

Limitation of extension may be due to facet or posterior column dysfunction whereas discogenic pain can occur with either flexion or extension. Discogenic pain with referral to one upper limb can be triggered by side flexion to and/or rotation away from the affected side.

Key Point

Range of Motion testing should be done in 3 specific planes; flexion-extension, lateral flexion and rotation. Moving the neck in circles does not provide useful clinical information.



Neurological Testing

A neurological screen should include testing reflexes, strength and sensation as well as an upper motor neuron test such as the Hoffman's test. The latter has a 50-80% sensitivity and 78% specificity. The Spurling's test and cervical distraction are useful for diagnosing radicular symptoms.

Radicular arm dominant pain usually indicates nerve root irritation through cytokine and inflammatory mediators combined with compression from a disc herniation. Cervical disc herniations commonly affect C5-6 or C6-7 producing C6 or C7 symptomatology respectively.

For the Spurling's test, the patient sits with the examiner standing behind. The patient side bends and slightly rotates the neck to the painful side while the clinician applies light compressive force to the top of the head. A positive test reproduces the patient's typical arm pain.

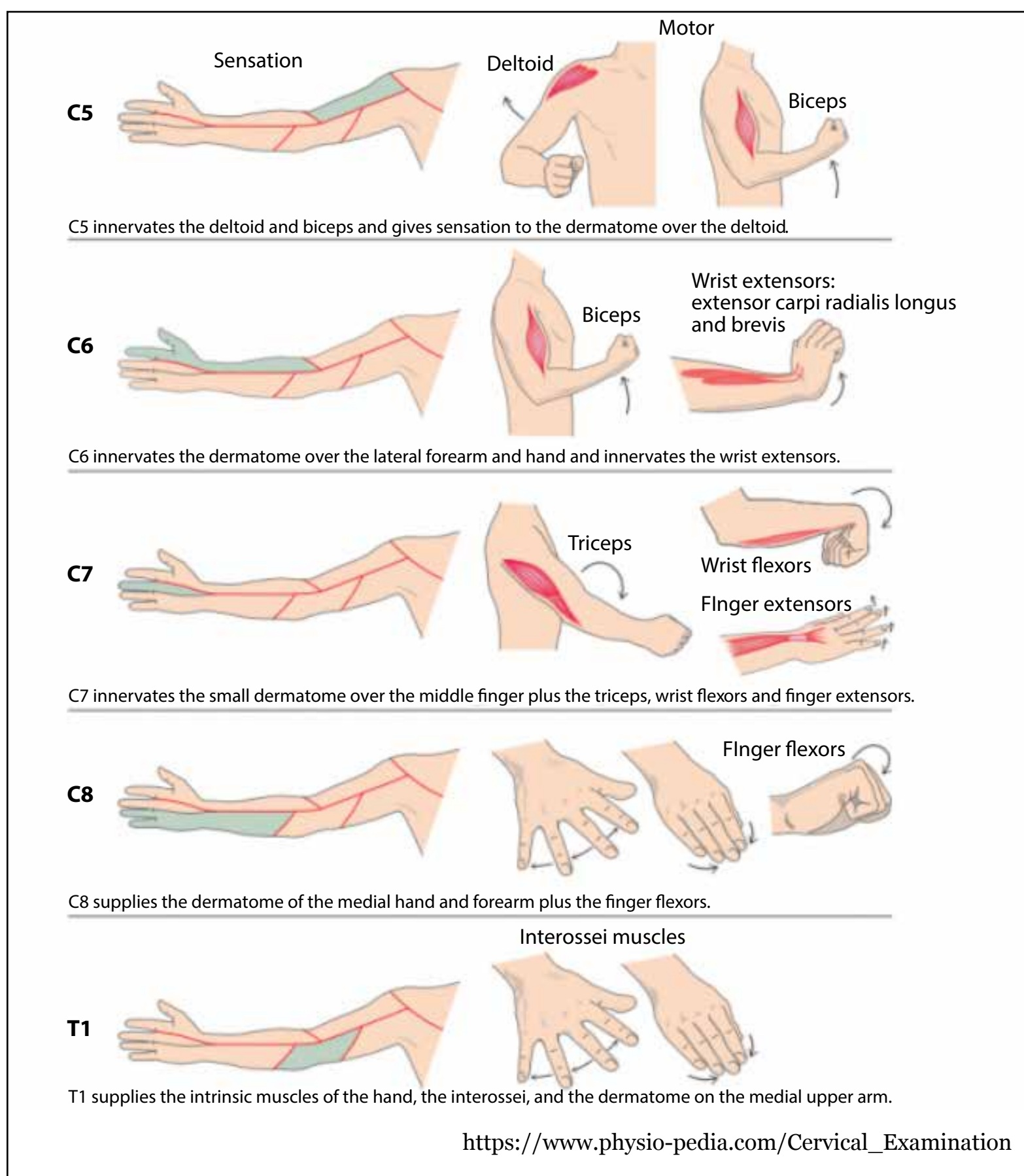
The cervical distraction test starts with the patient lying supine while the examiner holds the patient's head under the chin and occiput and flexes the patient's neck to a position of comfort. The examiner then starts to pull. A positive test occurs when the traction reduces the patient's upper extremity symptoms.

Neither the Spurling's nor the cervical distraction test is indicated if the patient does not have arm dominant pain. Spurling's test has

a 93% specificity but a low sensitivity of 30% while the cervical distraction test has a 97% specificity with a sensitivity of 44%.⁷ Using a combination of the two tests, the clinician is more likely to identify the patients who do not have radiculopathy (true negative rate).

Management

First, decide if the pain is neck or arm dominant. The location separates structural pain arising in a disc or joint from radicular limb pain caused by nerve root irritation. Next, establish if the neck pain is acute, less than 3 months,



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or chronic. That may alter the main focus of the management since long standing neck pain is frequently associated with emotional and psychosocial issues.⁸ Evidence based treatment includes both non-pharmacological and pharmacological interventions. The primary goal is to decrease pain through selected positions and maneuvers combined with effective medication while increasing activity through education, modified daily activities and exercise.⁹ Physiotherapy can be helpful when the initial treatment does not relieve symptoms or when there is excessive associated muscle guarding, stiffness and pain irritability. In chronic neck pain management, medications may need to advance to anti-depressants or anti-epileptics. In all neck pain cases, the foundation of treatment is progressive graduated exercise.

Certain commonly prescribed treatments have no evidence to

support their use and may even retard recovery. These include cervical collars, neck pillows and passive modalities and in chronic neck pain, cervical traction, opioid use and relaxation massage.

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CLINICAL PEARLS

Level	Pain Pattern	Physical Examination	Incidence
C5	Lateral shoulder and upper arm	Deltoid/Bicep Weakness	10%
C6	Thumb/Index finger	Bicep/Wrist Extensor	20-25%
C7	3rd Digit	Triceps/Finger Extensors	45-60%
C8	4th/5th Digit	Finger Flexors	10%



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