Background

Neck pain is very common. Approximately 10% of the adult population has neck pain at any given time and two thirds of adults are affected by neck pain at some time during their life. The majority of patients with neck pain don’t miss work, do well and recover with conservative therapy. And less than 1% have neurologic symptoms. But even so, neck pain is so common it is still a very frequent cause of disability in the United States. Managing those who do have persistent symptoms can be very complex due to high variability of patient’s signs and symptoms, low specificity of diagnostic tests, and a relative lack of consistent evidence-based treatment recommendations. Effectively providing best-practice clinical care for patients with neck pain is a high priority at Sutter Health and aligns with the key Sutter Health goals. It helps improve clinical outcomes, patient quality of life, and affordability of health care.

Clinical Practice Guidelines Benefit

A clinical practice guideline improves consistency of best-practice evidence-based care in a health care organization. It allows all members of a care team to screen, diagnosis, monitor, treat and educate patients using standard recommendations consistently across care environments, specialties, and affiliates. It helps ensure outcome metrics are consistent with recommended patient care. It helps translate best practice care into electronic health record tools and standards, patient education materials, and staff training resources. And it provides a means to adjust care efficiently and consistently across the organization when new evidence emerges. Implementation of clinical practice guidelines is a key recommendation of national campaigns to improve clinical outcomes of chronic conditions.

Guideline Committee Process

The following Sutter Health Adult Neck Pain Clinical Practice Guideline was written by a 57-person multi-disciplinary team from across Sutter Health. The team was carefully crafted to represent the wide spectrum of Sutter Health’s clinical community: geography (both Bay and Valley geographic regions), types of providers (spinal surgeons, non-surgical specialists, primary care physicians, advanced practice clinicians, registered nurses, physical therapists, and pharmacists), type of practice (foundation and independent affiliates), type of department (local office and system office), and type of work (in-person patient care, case management, quality and population health). A patient representative was included in the writing team. Writing this guideline was a multi-step process. Key systematic reviews and guidelines for neck pain were identified by a Sutter Health librarian. The recommendations from each source were carefully reviewed by the committee, and those recommendations with the strongest evidence most consistent with best practice care for the Sutter Health population were included.

Guideline Recommendations

This guideline is intended for the care of adults with neck pain. It is not intended for pregnant patients, children or adolescents. It is intended to help clinicians, educators, case managers and patients make decisions according to standard clinical practice and to improve the care and management of patients with neck pain at Sutter Health. However, it should not replace individual clinical judgment nor specialty consultation when indicated. All clinical decisions should be made within the context of the specific situation for each patient, including current health, medications, risk of treatment side effects, quality of life, life expectancy, and patient preference.
**Classification**

**Causes:** See Table 1 for classification of causes of Neck Pain

**Duration**
- Acute neck pain (up to 6 weeks)
- Subacute neck pain (6 to 12 weeks)
- Chronic neck pain (more than 12 weeks)
- Recurrent
- Post-Surgical

**Grade**
- Neck Pain Associated Disorders (NAD)
  - I. No signs of major pathology and little interference with daily activities
  - II. No signs of major pathology but impacts daily activities
  - III. Neck pain with neurologic signs or symptoms (radiculopathy)
  - IV. Neck pain with major structural pathology (e.g. fracture, myelopathy, neoplasm, spinal infection)
- Cervical Strain/Sprain (also called "Whiplash Associated Disorder [WAD])
  - Grade 1. Neck pain or stiffness with no physical signs
  - Grade 2. Neck pain or stiffness with physical signs (like decrease range of motion [ROM] or point tenderness)
  - Grade 3. Neck pain or stiffness with neurologic signs
  - Grade 4. Neck pain or stiffness with fracture or dislocation
  - Grade 1-3 are called “whiplash”

**Goals**

**Assessment Goals**
- The goals of neck pain assessment include:
  - Distinguish serious conditions that require intervention from those that are less serious.
  - Identify signs and symptoms of significant neurologic compromise.
    - Note: Determining the other underlying causes of neck pain is less important
- Use empathetic and reassuring tone and language. Address patient’s fears.

**Treatment Goals**
- Maintain or restore function
- Improve pain
- Prevent long-term disability
- Prevent recurrences

**Communication**

**Key Messages for general neck pain**
- Return to normal activities that don’t provoke the pain as soon as possible.
- Recovery is expected within the first 2 to 3 months.
- Exercises to decrease pain and increase ROM.
- Minimize the use of a cervical collar.
Types of Non-Surgical Specialists who Treat Patients with Neck Pain

Choose an appropriate specialist according to the specific clinical situation, diagnosis and needs of the patient.

- Pain Management Specialist — Physicians from specialties below with advanced certification and training in the evaluation, management, treatment & specific interventions for back & neck pain.7
- Physical Medicine & Rehabilitation (PM&R) — Physicians trained in different conditions affecting the brain, spinal cord, nerves, bones, joints, ligaments, muscles, and tendons focusing on improving quality of life and ability to function. 8
- Anesthesiology — Physicians trained in helping patients with serious acute, chronic or recurring pain. 10
- Neurology — Physicians that diagnose, treat, and manage disorders of the brain and nervous system. 11
- Sports Medicine — Physicians trained in improving athletic performance and in treating athletic and musculoskeletal injuries. 12
- Osteopathic Manipulative Medicine (OMM) — Physicians trained in OMM. 13
- Integrative Medicine — Physicians trained to use a variety of different therapeutic modalities and approaches to treat chronic conditions 14
- Rheumatology — Physicians trained in the diagnosis and treatment of musculoskeletal disease and systemic autoimmune conditions 15
Algorithm 1: Ambulatory Neck Pain Algorithm

Acute Neck Pain

History and Physical Exam: Assess Red and Yellow Flags. See Box 1 & 2 and Table 3

Red Flags Positive or NAD IV

Box 3 and Table 3

Appropriate Imaging and/or Tests

Table 3

The Imaging and/or Tests are Suspicious

Refer as Appropriate based on Table 3

Specialized treatment based on etiology

Red Flags Negative and NAD I-III

Canadian C-spine Rule Positive? Algorithm 4

No

Yes

Signs and symptoms of radiculopathy (NAD III)?

Table 4

No

Yes

Yellow Flags? Box 2

Yes

No

1. Consider imaging

1. Early referral to PT Box 4

2. Medication for acute pain as needed

3. May consider early imaging if significant or progressive neurologic deficit Table 3

4. Refer patients to a pain management specialist if rapidly progressive or persistent radiculopathy (> 4 weeks)

Subacute Neck Pain (6-12 weeks)

Persistent pain or functional impairment

1. Reassurance that high proportion of neck pain self-resolves Box 4

2. Education and handouts about Self-Care Box 4

3. Early referral to PT if significant pain or functional impairment Box 4

4. Medications as needed that are effective for acute pain

Follow-up 4-6 weeks

Chronic Neck Pain (> 12 weeks)

Persistent pain or functional impairment

1. Reinforce education and self-management Box 4

2. Reassess for Red Flags Table 3

3. Reassess for Radiculopathy – consider imaging if persistent radiculopathy > 4 weeks Table 4

4. Refer to PT (if not already referred) Box 4

5. Prescribe medications effective for chronic pain (avoid opioids)

6. Consider therapies and referrals below based on severity of symptoms, availability and shared decision making

- Modalities effective for pain (acupuncture, massage, etc) Box 4

- Evaluate psychosocial factors & refer to cognitive behavioral therapy if needed Box 4

- Referral to Non-surgical specialist Table 4

Follow-up 1-3 months

Education to prevent recurrence Box 4
Algorithm 2: Surgical Neck Pain Algorithm

Red Flags and imaging shows indication for surgery
   Table 3 and 4

Surgical Back or Neck Pain

Already tried non-surgical options as appropriate
   Box 4

Shared decision making tool

Pre-operative evaluation and management

Surgery Table 6

Enhanced Recovery

Early Mobilization

Multimodal analgesia

Post Acute Placement

Prevent Post-Surgical Infection and Readmissions

Post-Surgical

Chronic Post-Surgical Pain

1. Referral to non-surgical specialist and/or team-based multidisciplinary care
2. Prescribe medications effective for chronic pain (avoid opioids if able)
3. Consider other treatment modalities, spinal cord stimulation, repeat or alternate surgeries Table 4

Radiculopathy > 4 to 6 weeks (or rapidly progressive)
and imaging shows indication for surgery
   Table 4

Referral by a non-surgical specialist
   Table 4

Handout/Shared Decision Tools

- Smoking cessation (referral to California Smokers’ Helpline (1-800-NO-BUTTS)
- Diabetes management (< A1C 8.0)
- Hypertension management (BP at goal) Box 5
- Weight Management
- Osteoporosis management

Enhanced recovery such as: patient education, limited fasting, carb beverage 4 hours prior, adjunctive nonopioid analgesics, antiemetic prophylaxis, maintain euvoelma and normo-thermia, stop IV early, prompt oral intake, and rapid mobilization Box 6

Mobilization day of surgery (by protocol with nurse and automated PT referral) Box 6

Gabapentinoids, Acetaminophen, Neuraxial blockade, extended-release local infiltrative anesthetics, preemptive analgesia, NSAIDs Box 6

Use Risk tool to help determine optimal disposition locations Box 7

Optimize post-acute care for patients at risk Box 7
## Algorithm 3: Self-Management, Therapies and Referrals for Neck Pain

<table>
<thead>
<tr>
<th>Category</th>
<th>Intervention</th>
<th>Neck Pain Duration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Self-Management</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Education</td>
<td></td>
<td>Include handouts and other patient engagement tools about self-management, prevention, treatment options, and shared decision making.</td>
</tr>
<tr>
<td></td>
<td>Remain active</td>
<td></td>
<td>Encourage patients with neck pain to remain active.</td>
</tr>
<tr>
<td></td>
<td>Postural Modification</td>
<td></td>
<td>Avoid of provocative activities</td>
</tr>
<tr>
<td></td>
<td>Avoidance of provocative activities</td>
<td>✓</td>
<td>Consider use heat wrap for acute or subacute neck pain. Some patients may consider cold treatment.</td>
</tr>
<tr>
<td></td>
<td>Heat or Cold</td>
<td>✓</td>
<td>Consider use massage for neck pain.</td>
</tr>
<tr>
<td></td>
<td>Massage</td>
<td>✓</td>
<td>Consider use massage for neck pain.</td>
</tr>
<tr>
<td></td>
<td>Specific exercises</td>
<td>✓</td>
<td>Consider exercise programs for neck pain with evidence of effectiveness such as: Neck rotation, neck tilting, neck bending, shoulder rolls, supervised graded strengthening exercises, endurance exercises, Qigong and Yoga</td>
</tr>
<tr>
<td></td>
<td>Aerobic Exercise</td>
<td>✓</td>
<td>Activity that includes cardiovascular conditioning (such as activities like brisk walking, swimming, running, or cycling).</td>
</tr>
<tr>
<td><strong>Therapies</strong></td>
<td>Physical Therapy</td>
<td>✓</td>
<td>Refer patients with neck pain with Yellow Flags, radiculopathy, or significant pain or impaired function to PT at initial visit. Refer all patients with persistent subacute or chronic pain to PT. PT uses methods such as massage, heat treatment, and exercise and may include joint mobilization.</td>
</tr>
<tr>
<td></td>
<td>Acupuncture</td>
<td>✓</td>
<td>May consider acupuncture as an option to treat patients with significant subacute or chronic pain. Includes inserting very thin needles through a person's skin at specific points on the body, to various depths.</td>
</tr>
<tr>
<td></td>
<td>Mindfulness Based Stress Reduction</td>
<td>✓</td>
<td>Incorporates mindfulness practices such as meditation and breathing exercises</td>
</tr>
<tr>
<td></td>
<td>Cognitive Behavioral Therapy (CBT)</td>
<td>✓</td>
<td>Short-term, goal-oriented psychotherapy that takes a hands-on, practical approach to problem-solving.</td>
</tr>
<tr>
<td><strong>Referral</strong></td>
<td>Non-surgical specialists</td>
<td>✓</td>
<td>Refer patients to pain management specialist or other appropriate non-surgical specialist as indicated when significant radiculopathy or significant pain or impaired function &gt; 6 weeks.</td>
</tr>
<tr>
<td></td>
<td>Spine Surgeon</td>
<td>✓</td>
<td>Refer patients to a surgeon when imaging shows a surgical indication associated with red flags or rapidly progressive or persistent radiculopathy (&gt; 4 weeks). Includes neurosurgeons and orthopedic surgeons.</td>
</tr>
<tr>
<td></td>
<td>Team-based Multimodal &amp; Multidisciplinary Care</td>
<td>✓</td>
<td>Includes multiple specialist services and treatment modalities [4][10][1][2]</td>
</tr>
</tbody>
</table>

*Based on type, severity & progression of symptoms, availability, and shared decision making
Box 1

**History:**

**Consider use smart phrase**

- History of other conditions (including osteoporosis, cancer, arthritis, infection, etc.)
- Pain characteristics
  - Patients descriptors
    » Examples: numbness / tingling, burning, ache, pulsing, constant, intermittent, sharp, stabbing, shooting
  - Location of the pain
    » Radiation into shoulder or arm
  - Duration — acute < 6 weeks, subacute 6-12 weeks, or chronic > 12 weeks
  - History — first time or previous history of neck pain
  - Timing
    » Increasing, decreasing, fluctuating or unrelenting
    » Day or night pain
  - Severity and functional impairment
  - Response to positioning
  - Aggravating and alleviating factors
    » Activity associated with the onset of the pain
    » Response to positioning
  - Association with onset — such as trauma
- Neurologic symptoms including sensory and/or motor changes See Table 2
- Psychosocial issues
  - Depression screen
    » PHQ2 if no history of depression
    » PHQ9 if history of depressions or PHQ2 positive
  - Association with workman’s comp (as different/additional services may be available if so)
  - Medication adherence
  - Financial issues

**Red Flags**

See Table 3

**History**

- Recent major neck trauma — See Canadian C-spine rule
- Infection risk
- History of injection drug use
- Immunosuppression
- Chronic glucocorticoid use
- Unexplained weight loss
- History of cancer
- History of vascular disease
- History of inflammatory arthritis
Symptoms

• Unrelenting, new or severe headache
• Anterior neck pain
• Shoulder or hip girdle pain
• Weakness
• Gait difficulty or scissor gait
• Bowel or bladder dysfunction
• Fever or chills
• Nausea or vomiting
• Visual symptoms

Physical Signs

• Severe neck tenderness
• Substantial neck stiffness and/or Torticollis
• Rash
• Lhermitte’s phenomenon (shock-like paresthesia with neck flexion)
• Hoffmann’s sign
• Babinski’s sign
• Hyperreflexia
• Altered muscle tone
• Ataxia or balance problems
• Incontinence
• Altered cognitive status
• Visual loss
• Photophobia or phonophobia

Yellow Flags

Characteristics that increase risk of conversion of acute to chronic pain:

Consider questionnaires to identify a baseline status and to monitor pain, function, disability, and psycho-social function

• Pain severity at the time of injury
• Reduction in cervical range of motion
• Lack of social supports
• Depression
• Somatization
• Catastrophizing
• Cultural differences in expectations of pain
• Possibility of financial compensation
**Physical exam:**

**Focus on whether there are signs of serious or systemic causes of pain**

**Observation** — alignment and movement of the head, neck, and thoracic spine

- Neurologic Exam see Table 2
  - Muscle strength
  - Reflexes
  - Sensory exam
  - Upper motor neuron finding — such balance problems, scissor gate, Babinski sign

**Palpation** — paraspinal and upper trapezius muscles

**Range of Motion (ROM)** compared to normal below

- Rotate an average of 90 degrees
- Bend an average of 45 degrees laterally
- Forward flex to 60 degrees
- Extend backward 75 degrees

**Specific Maneuvers to help identify cervical radiculopathy**

- Spurling’s maneuver and modified Spurling’s maneuver ("neck compression test")
  - Downward pressure on the head in a neutral position (Spurling’s) (stop if positive) and with head tilted back and rotated towards side of pain (modified Spurlings).
  - Positive for radiculopathy if arm pain or paresthesia past the shoulder are produced (stop test if so). Production of neck pain alone is not a positive test.
  - Highly specific for cervical root compression (80% and 90%) but lower sensitivity so a positive test is helpful, but a negative test does not rule out radiculopathy.
  - Caution in suspected rheumatoid arthritis, cervical malformations, metastatic disease, or suspected cervical myelopathy. It may injure the spine.

- Cervical distraction test
  - The head is lifted releasing the pressure on the nerve roots.
  - Positive for radiculopathy if the pain is decreased.

- Shoulder abduction relief test
  - Place the affected arm above the head and rest the hand on the top of the head.
  - Positive if decrease symptoms with procedure.
  - Some patients may use the position it to help relieve their symptoms.

- Elvey’s upper limb tension test
  - Turn the head and abduct the arm with the elbow extended (similar to straight leg raise in the lower extremity).
  - Positive for radiculopathy if reproduces arm pain.

- Lhermitte’s phenomenon
  - Shock-like paresthesia with neck flexion

- Hoffman’s test
  - “Flicking” the nail of the person’s middle finger causes the index finger and the thumb to move

**Other systems or areas as indicated by history**
**Box 3**

**Imaging:**

No Imaging for acute neck pain if

- No Red Flags
- Mild pain that does not affect daily activities and no signs or symptoms of radiculopathy
- Negative Canadian C-spine rule if trauma

Imaging and/or appropriate tests if See Table 3.

- Red Flags
- Positive Canadian C-Spine rule if trauma. See algorithm 4.
- Cervical radiculopathy signs and symptoms
  
  - Consider early imaging if:
    - significant or progressive neurologic deficit
    - risk of or suspicion for neoplasm, infection, inflammatory etiology
  
  - Otherwise consider imaging after four to six weeks of conservative therapy

**Individualized Decision**

- Consider imaging if persistent moderate to severe neck pain (even without trauma, red flags or radiculopathy) lasting more than 6 weeks and affecting sleep, daily activities and/or occupation
- If so, consider x-ray (use of CT or MRI individualized)

---

**Box 4**

**Prevention and Treatment:**

**Primary Prevention of first episode** (Handout):

- Exercise may help prevent first episode if neck pain.
- In general, education does not generally prevent first episodes of neck pain. However, education after whiplash injury may prevent development of pain.

**Self-Management** (Handout)

- Education
  - Provide education and educational handouts
  - address barriers to care
- Ergonomics
  - Sit straight with the head tall, chin minimally down, shoulders down
  - Minimize weight of items carried over the shoulder
  - Avoid prolonged sitting
  - Use pillow that aligns the head and neck with the body
- Self-care
  - Avoid rest for more than 3 days (acute)
  - Avoid of provocative activities
  - Consider topical heat or cold
Exercises
» Neck rotation, neck tilting, neck bending, shoulder rolls
» Supervised graded strengthening exercises
» Endurance exercises
» Tai Chi, Qigong, Yoga
Note: choose type based on patient preference and availability
• Massage (subacute or chronic)
• Aerobic exercise (chronic)

Therapies and Modalities of Care for Neck Pain
Make decisions based on local availability, nature and severity of neck pain and function, progression of symptoms, and shared decision making with the patient.

Consider Modalities Below:
• Physical Therapy (acute and chronic)
  - Refer early (at initial visit) if patient has yellow flag, radiculopathy, or significant pain or impaired function. Otherwise refer all neck pain patients if pain or impaired function persists after 6 weeks
  - Include postural modification, activities that encourage movement, improve strength, and preserve or increase range of motion.
  - Includes cervical, shoulder, and scapulothoracic strengthening, stretching, and stabilizing exercises.
• Acupuncture (subacute)
• Mindfulness-based stress reduction (chronic)
• Cognitive Behavior Therapy

Avoid/minimize/individualize options below:
• Used only as part of a specialized situation or therapy
  - Cervical collar
  - Traction
• Carries risk
  - High velocity chiropractic adjustments of the neck ("cracking the neck") – which carries risk for adverse outcomes including carotid vessel dissection, thrombus formation, stroke and paralysis.
• No significant evidence of effectiveness
  - Botulinum toxin injections
  - Low-level laser therapy
  - Transcutaneous electrical nerve stimulation
  - EMG Feedback
### Box 5

**Pre-surgical evaluation and management:**

**Evaluate and modify risk factors for elective (non-emergent) procedures**

- Smoking (nicotine)
  - Increases risk of surgical infections after surgery
  - Fusion is more successful in nonsmokers
  - Patients should stop smoking before surgery. Refer to smoking cessation program
- Diabetes
  - Increases risk of surgical infections after surgery
  - Goal of A1C < 8.0 before surgery
- Hypertension
  - Increases risk of surgical infections after surgery
  - Goal of BP at goal before surgery
- Obesity
  - Increases risk of surgical infections after surgery
- Osteoporosis
  - Consider treating osteoporosis before surgery

### Box 6

**Perioperative Care:**

**Mobilize early after surgery**

- Use protocols to mobilize the patient the same day of surgery to reduce post-operative complications, LOS, performance tests, and patient reported outcomes.

**Use Multimodal approaches to post-operative pain management**

- The following medications for post-operative pain management leads to improved surgical outcome, reduced hospital stays, reduced dependence on opioids, and decreased development of new chronic pain conditions.
  - Gabapentinoids
  - Acetaminophen
  - Neuraxial blockade (intrathecal, epidural)
  - Extended-release local infiltrative anesthetics
  - Preemptive analgesia
  - NSAID

**Use Enhanced recovery strategies**

- Early pre-operative evaluation and management, multimodal post-operative pain management and early-mobilization as above and the following additional actions leads to improve length of stay, healthcare costs, complication rate, pain control, post-op opioid use, and patient satisfaction.
  - Education and discharge planning
  - Nutrition and metabolism optimization
  - Screening for chronic opioid use
  - Screening for sleep apnea
  - Coordination of post-surgical clinical team, care management, and post-acute care follow-up.
Box 7

Transitions of Care and Post-Acute Care:

Discharge Planning – include acute case management in assessment and management
• Assess patient functional status and rehabilitation needs.
• Create a comprehensive, structured, individualized care plan in collaboration by the patient’s care team (surgeon, hospitalist, physical therapist, etc.).
• Identify care needs and potential barriers to care. Help plan patient support system.
• Provide a discharge summary with easy to identify information about spinal precautions, wound care, and therapy recommendations.
• Ensure discharge summary and plan of care is sent to providers seeing patient after discharge.

Discharge Disposition
• Use model or risk score to predict level of care at discharge with goal to send patients home or lowest level of care when able 27, 28, 29, 30, 31, 32

Prevent Readmissions
• Provide extra support for patients with highest risk of readmissions – including risk factors below 18.
  - American Society of Anesthesiology score of 3-4+
  - Longer operative duration
  - Medicare/Medicaid
  - Older age
  - Smoking, COPD
  - Kidney disease, Heart disease, Diabetes
• Notes: The most common cause of readmission is wound infection 18. Most re-admissions occur within 10 days of hospital discharge. 30

Post-Acute Care
• Follow-up with appropriate physician within two weeks of discharge.

Follow-up
• Use the Neck Disability Index to monitor patient reported outcomes over time (including administer the questionnaire before surgery as well).
Algorithm 4: Adult Canadian C-spine Rule Algorithm

**Canadian C-Spine Rule**

For alert (Glasgow coma score = 15) and stable trauma patients where cervical spine injury is a concern

- **Any high risk factor that mandates radiography?**
  - Age $\geq 65$ years
  - Dangerous mechanism* of injury
  - Paresthesias in extremities

  - No

- **Any low risk factor that allows safe assessment of range of motion?**
  - Simple rear end motor vehicle collision†
  - Sitting position in emergency department
  - Walking at any time
  - Delayed onset of neck pain‡
  - Absence of midline cervical spine tenderness

  - No

- **Able to actively rotate neck?**
  - $45^\circ$ left and right

  - Able

  - No radiography

  - Unable

Rule not applicable if: non-trauma cases, Glasgow coma score $\leq 15$, unstable vital signs, age $\leq 16$ years, acute paralysis, known vertebral disease, or previous surgery of cervical spine

*Fall from elevation $\geq 0.9$ m (3 feet)/five stairs, axial load to head — for example, diving, motor vehicle collision high speed, ($\geq 100$ km/h), rollover, ejection, motorised recreational vehicles, bicycle struck or collusion

†Excludes: pushed into oncoming traffic, hit by bus or large truck, rollover, hit by high speed vehicle

‡Not immediate onset of neck pain

### Table 1. Classification of Neck pain in adults

<table>
<thead>
<tr>
<th>Neck or Neurologic Etiology</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degenerative changes of the spine is the most common cause</td>
<td></td>
</tr>
<tr>
<td><strong>Musculoskeletal</strong></td>
<td></td>
</tr>
<tr>
<td>• Cervical strain or &quot;Whiplash&quot; injury</td>
<td></td>
</tr>
<tr>
<td>• Cervical discogenic pain (contributes to more than 70% of neck pain)</td>
<td></td>
</tr>
<tr>
<td>• Cervical facet osteoarthritis (estimated to contribute to 40-50% of neck pain)</td>
<td></td>
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<tr>
<td>• Cervical myofascial pain (common cause)</td>
<td></td>
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<tr>
<td>• Cervical spinal stenosis</td>
<td></td>
</tr>
<tr>
<td>• Diffuse skeletal hyperostosis (DISH)</td>
<td></td>
</tr>
<tr>
<td>• Referred shoulder pain (eg, impingement, adhesive capsulitis, rotator cuff tear)</td>
<td></td>
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<tr>
<td>• Tension headache</td>
<td></td>
</tr>
<tr>
<td><strong>Cervical radiculopathy</strong></td>
<td></td>
</tr>
<tr>
<td>• Cervical Radiculopathy C7 is the most commonly affected nerve root; the most frequent age is 50-55; it is more common in men than women.</td>
<td></td>
</tr>
<tr>
<td>• Cervical spondylotic myelopathy</td>
<td></td>
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<tr>
<td>• Ossification of the posterior longitudinal ligament</td>
<td></td>
</tr>
<tr>
<td><strong>Neurologic</strong></td>
<td></td>
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<tr>
<td>• Cervical dystonia</td>
<td></td>
</tr>
<tr>
<td>• Chiari malformation (CM-1)</td>
<td></td>
</tr>
<tr>
<td>• Peripheral neuropathy</td>
<td></td>
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<tr>
<td>• Amyotrophic lateral sclerosis</td>
<td></td>
</tr>
<tr>
<td>• Transverse myelitis</td>
<td></td>
</tr>
<tr>
<td>• Guillain-Barré syndrome</td>
<td></td>
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<tr>
<td>• Brachial plexus lesion</td>
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<tr>
<td><strong>Endocrine</strong></td>
<td></td>
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<tr>
<td>• Paget’s disease</td>
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<tr>
<td>• Osteoporotic fractures</td>
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<tr>
<td><strong>Rheumatology</strong></td>
<td></td>
</tr>
<tr>
<td>• Polymyalgia rheumatica</td>
<td></td>
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<tr>
<td>• Giant cell arteritis</td>
<td></td>
</tr>
<tr>
<td>• Fibromyalgia</td>
<td></td>
</tr>
<tr>
<td>• Thoracic outlet syndrome</td>
<td></td>
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<tr>
<td>• Rheumatoid arthritis</td>
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<tr>
<td>• Seronegative spondyloarthropathies</td>
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<tr>
<td><strong>Vascular conditions</strong></td>
<td></td>
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<tr>
<td>• Vertebral or carotid artery dissection</td>
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<tr>
<td>• Arteriovenous fistula or malformation</td>
<td></td>
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<tr>
<td><strong>Infection</strong></td>
<td></td>
</tr>
<tr>
<td>• Osteomyelitis</td>
<td></td>
</tr>
<tr>
<td>• Epidural abscess</td>
<td></td>
</tr>
<tr>
<td>• Discitis</td>
<td></td>
</tr>
<tr>
<td>• Herpes zoster</td>
<td></td>
</tr>
<tr>
<td>• Meningitis</td>
<td></td>
</tr>
<tr>
<td>• Pharyngeal abscess</td>
<td></td>
</tr>
<tr>
<td><strong>Malignancy</strong></td>
<td></td>
</tr>
<tr>
<td>• Metastatic tumor</td>
<td></td>
</tr>
<tr>
<td>• Multiple myeloma</td>
<td></td>
</tr>
<tr>
<td>• Spinal cord tumors</td>
<td></td>
</tr>
<tr>
<td>• Chordoma</td>
<td></td>
</tr>
<tr>
<td><strong>Visceral</strong></td>
<td></td>
</tr>
<tr>
<td>• Esophageal obstruction</td>
<td></td>
</tr>
<tr>
<td>• Biliary tract disease</td>
<td></td>
</tr>
<tr>
<td>• Apical lung tumor</td>
<td></td>
</tr>
</tbody>
</table>
### Table 2. Upper extremity nerve roots, pain, myotomes, dermatomes, and reflexes by lumbar nerve root

<table>
<thead>
<tr>
<th>Nerve Root</th>
<th>Pain</th>
<th>Numbness</th>
<th>Weakness</th>
<th>Reflex affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>C5</td>
<td>Neck, shoulder, scapula</td>
<td>Lateral arm (in distribution of axillary nerve)</td>
<td>Shoulder abduction, external rotation, elbow flexion, forearm supination</td>
<td>Biceps, brachioradialis</td>
</tr>
<tr>
<td>C6</td>
<td>Neck, shoulder, scapula, lateral arm, lateral forearm, lateral hand</td>
<td>Lateral forearm, thumb and index finger</td>
<td>Shoulder abduction, external rotation, elbow flexion, forearm supination and pronation</td>
<td>Biceps, brachioradialis</td>
</tr>
<tr>
<td>C7</td>
<td>Neck, shoulder, middle finger, hand</td>
<td>Index and middle finger, palm</td>
<td>Elbow and wrist extension (radial), forearm pronation, wrist flexion</td>
<td>Triceps</td>
</tr>
<tr>
<td>C8</td>
<td>Neck, shoulder, medial forearm, fourth and fifth digits, medial hand</td>
<td>Medial forearm, medial hand, fourth and fifth digits</td>
<td>Finger extension, wrist extension (ulnar), distal finger flexion, extension, abduction and adduction, distal thumb flexion</td>
<td>None</td>
</tr>
<tr>
<td>T1</td>
<td>Neck, medial arm and forearm</td>
<td>Anterior arm and medial forearm</td>
<td>Thumb abduction, distal thumb flexion, finger abduction and adduction</td>
<td>None</td>
</tr>
</tbody>
</table>
Table 3. RED FLAG Key Features of Neck Pain and Imaging studies

<table>
<thead>
<tr>
<th>Cause</th>
<th>Key features on history or physical examination (Red Flags)</th>
<th>Imaging and other tests</th>
<th>Referral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervical spondylotic myelopathy (spinal cord dysfunction)</td>
<td>Gait or coordination difficulties such as a spastic or scissoring gait (this is a common, early symptom) 33, 5 Lower extremity weakness with upper motor neuron signs: increased reflexes, increased tone, loss of vibration sense, and Babinski signs 33 Weakness, atrophy, and decreased reflexes in the arms or hands (in a myotomal distribution – C5-7 are most common) 33 Bowel or bladder dysfunction such as urgency, frequency, and/or retention (less common). 33, 5 Lhermitte sign positive. 33, 5</td>
<td>MRI</td>
<td>Spinal Surgeon</td>
</tr>
<tr>
<td>Ossification of the posterior longitudinal ligament</td>
<td>Neck pain and stiffness 5 Progressive radiculopathy and/or myelopathy symptoms. 5 Focal neurologic signs in upper and/or lower extremities 5</td>
<td>MRI</td>
<td>Spinal Surgeon</td>
</tr>
<tr>
<td>Fracture</td>
<td>Recent major neck trauma (Use Canada C-spine rule to decide about imaging if trauma) 5</td>
<td>CT scan*</td>
<td>Spinal Surgeon</td>
</tr>
<tr>
<td>Infection</td>
<td>Fever/chills Imunosuppression Signs consistent with type of infection (such as osteomyelitis, discitis, pharyngeal abscess, meningitis) 5</td>
<td>MRI; WBC, ESR, CRP; Lumbar puncture</td>
<td>Urgent admission/referral depending on type and acuity of infection</td>
</tr>
<tr>
<td>Cancer</td>
<td>Prior history of cancer 5 Unexplained weight loss 5 Localized tenderness on palpation of spine 5</td>
<td>MRI</td>
<td>Urgent referral to oncologist**</td>
</tr>
<tr>
<td>Chiari malformation</td>
<td>Neck pain or headache from meningeal irritation 5 Focal CNS signs 5</td>
<td>MRI</td>
<td>Spinal Surgeon</td>
</tr>
<tr>
<td>Polymyalgia Rheumatica</td>
<td>Symmetrical Aching and morning stiffness in shoulders, hip, neck, and torso. 5 Decreased range of motion of joints in affected areas 5 Normal muscle strength 5</td>
<td>ESR, CRP</td>
<td>Rheumatologist</td>
</tr>
<tr>
<td>Giant cell arteritis</td>
<td>Constitutional symptoms 5 Headache 5 Visual loss 5 Prominent and/or tender temporal artery 5 Absent temporal artery pulse 5</td>
<td>ESR, CRP, temporal artery biopsy</td>
<td>Rheumatologist</td>
</tr>
<tr>
<td>Thoracic outlet syndrome</td>
<td>Focal neurologic signs and symptoms in upper extremities (numbness, paresthesia, weakness) 5 Signs of venous or arterial compression in the upper extremities (e.g., swelling, pain, pallor, and/or coldness in the hand) 5</td>
<td>CTA or MRA EMG/NCS Neck and chest US with Doppler</td>
<td>Vascular surgeon</td>
</tr>
<tr>
<td>Vertebral or carotid artery dissection</td>
<td>Sudden onset of focal motor and/or sensory deficits 5</td>
<td>MRI/MRA or CTA</td>
<td>Vascular surgeon</td>
</tr>
<tr>
<td>Cervical radiculopathy (nerve root dysfunction)</td>
<td>Pain, tingling, numbness, and/or weakness in the upper extremity in a dermatomal distribution 5 Note the signs and symptoms are often non-localizing because of extensive overlapping dermatomes. 16</td>
<td>&gt; 6 weeks: MRI &lt; 6 weeks: consider MRI if significant or progressive neurologic deficit or other red flags</td>
<td>Pain management specialist (or spinal surgeon if substantial or progressive motor weakness)</td>
</tr>
</tbody>
</table>

*X-ray can miss fractures as difficult to see due to shoulder blade – if use X-ray be sure to get swimmer’s view
** Or consult with current specialist if patient already has one
### Table 4. Types, Causes and Treatment of Mechanical Neck Pain

<table>
<thead>
<tr>
<th>Types of Neck Pain</th>
<th>Characteristics</th>
<th>Referral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non Specific Neck Pain</td>
<td>The most common cause is degenerative changes (esp. between C4 and C7). Degenerative changes are common and nonspecific.SZMultiple cervical spine conditions often occur together.SZDetermining the specific cause is usually not possible or necessary.SZImaging: The majority of patients do not require imaging.</td>
<td>Reassurance, education and self-care.SZRemain active.SZAvoid provocative activities.SZPhysical Therapy if substantial pain or impairment, positive yellow flags or pain persists &gt; 4 weeks.SUse medications effective for acute and/or chronic pain as appropriate (avoid opioids if able)SCConsider therapies with evidence of benefit:SZ • HeatSZ • MassageSZ • Exercise programsSZ • Aerobic ExerciseSZ • AcupunctureSZ • Mindfulness Based Stress ReductionSZ • Cognitive Behavioral Therapy (CBT)SCReferral to an appropriate non-surgical specialist and/or team-based multidisciplinary care</td>
</tr>
<tr>
<td>Cervical radiculopathy – nerve root dysfunction</td>
<td>Pain, tingling, numbness, and/or weakness in the upper extremity in a dermatomal distribution (often non-localizing because of extensive overlapping dermatomes)SZDecreased or altered sensation, diminished deep tendon reflexes, and/or decreased strength in upper extremitySZNNote: Most common disk is C7 (70%). Average age 50. Men more common than women. SZRRecommend imaging if persistent symptoms &gt; 4 to 6 weeks, or before that if progressive or severe signs and symptoms.</td>
<td>Self-care and educationSZAvoid provocative activitiesSZPhysical TherapySZUse medications effective for acute and/or chronic pain as appropriate (avoid opioids if able)SZConsider therapies with evidence of benefit:SZ • HeatSZ • MassageSZ • Exercise programsSZ • Aerobic ExerciseSZ • Physical TherapySZ • AcupunctureSZ • Mindfulness Based Stress ReductionSZ • Cognitive Behavioral Therapy (CBT)SZReferral to pain management specialist and/or team-based multidisciplinary careSZRefer patients to a surgeon when imaging shows a surgical indication associated with red flags or rapidly progressive or persistent radiculopathy (&gt; 4 weeks).</td>
</tr>
<tr>
<td>Cervical spondylolytic myelopathy – spinal cord dysfunction</td>
<td>Pain in the neck, scapula or shoulders, often radiating to the armsSZGait or coordination difficulties such as a spastic or scissoring gait (this is a common, early symptom)SZLower extremity weakness with upper motor neuron signs: increased reflexes, increased tone, loss of vibration sense, and Babinski signsSZWeakness, atrophy, and decreased reflexes in the arms or hands (in a myotomal distribution – C5-7 are most common)SZBowel or bladder dysfunction such as urgency, frequency, and/or retention (less common)SZLhermitte sign positive.SZOften gradual onset but may suddenly worsen after minor traumaSZPatients can deteriorate progressively or in a stepwise fashion with long periods of stability.</td>
<td>Avoid high-risk or aggravating activities.SZUse medications (avoid opioids if able)SZReferral to pain management specialist and/or team-based multidisciplinary care.SZReferral to spinal surgeon if severe myelopathy or progressing deficitsSZEmergent referral to spinal surgeon if acute deteriorationSZ</td>
</tr>
</tbody>
</table>
Table 4. Types, Causes and Treatment of Mechanical Neck Pain, cont.

<table>
<thead>
<tr>
<th>Types of Neck Pain</th>
<th>Characteristics</th>
<th>Referral</th>
</tr>
</thead>
</table>
| Ossification of the posterior longitudinal ligament (OPLL)             | Caused by abnormal calcification of the posterior longitudinal ligament \[^{35}\]  
Neck pain, stiffness, and progressive radiculopathy or myelopathy symptoms. \[^{5}\]  
Focal neurologic signs in upper and/or lower extremities may be present  
May be associated with spondyloarthropathies, \[^{35}\]  
More common in Asian people and in men typically age 40-60s \[^{35}\] | Referral to pain management specialist and/or team-based multidisciplinary care  
Referral to spinal surgeon to consider surgical decompression if significant radiculopathy or myelopathy symptoms from compression |
| Chronic Post-Surgical Neck Pain                                         | Persistent chronic pain after spinal surgery                                      | Referral to pain management specialist and/or team-based multidisciplinary care            |

Table 5: Non-surgical neck pain interventions.[^1][^3][^2]

Procedures may be for diagnosis or treatment

Indications subacute or chronic symptoms that are progressive > 6 weeks of conservative therapy

Refer to a pain management specialist for treatment recommendations, discussion of the relative evidence of effectiveness given each individual situation, and appropriate additional referrals if needed.

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Diagnostic or Therapeutic</th>
<th>General Description/Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epidural Steroid Injections</td>
<td>Diagnostic and Therapeutic</td>
<td>Helps differentiate cervical radiculopathy from other causes of pain and provide relief for patients with significant pain despite conservative therapy. May be considered for axial neck pain and post-laminectomy syndrome. Relative contraindication in patients with severe stenosis or myelopathy.</td>
</tr>
<tr>
<td>Cervical Medial Branch Block</td>
<td>Diagnostic</td>
<td>Anesthetize the innervation of the cervical facet joint. Used to diagnose facet-joint mediated neck pain</td>
</tr>
<tr>
<td>Radiofrequency Ablation (RFA)</td>
<td>Therapeutic</td>
<td>Used for facet-joint-mediated neck pain [^{3}] if successful response to previous cervical medial branch block</td>
</tr>
</tbody>
</table>
**Table 6: Surgical neck pain interventions.** 36,3,34

Recommend surgical evaluation for neck pain patients with red flags and imaging consistent with surgical etiology, severe or progressive motor weakness, or radiculopathy with progressive significant neuropathy.

Recommend discussion of the relative evidence of effectiveness of treatment options given each individual situation.

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Type of Condition</th>
<th>General Description</th>
<th>Indication</th>
</tr>
</thead>
</table>
| **Anterior Cervical Discectomy and Fusion** | Cervical Radiculopathy or Cervical Myelopathy | Conservative management should be tried before surgery unless progressive nerve or spinal cord compression resulting in a significant neurologic deficit. Divided into anterior, posterior, or combined surgical approach. | Instability of the cervical spine  
Spondylotic cervical myelopathy  
Cervical radiculopathy  
Ossification of the Posterior Longitudinal Ligament (OPLL)  
Cervical synovial cyst  
Degenerative cervical kyphosis  
Pseudoarthrosis  
Instrumentation failure  
Progressive neck pain or deformity following prior posterior cervical decompressive laminectomy or laminoplasty |
| **Cervical Laminectomy/ Laminotomy, with or without Fusion** | Posterior approach for decompression with or without fusion | Cervical radiculopathy, myelopathy and conditions above |                                                                                                   |
| **Cervical Laminoplasty** | Multilevel spinal stenosis with or without myelopathy | Posterior approach with laminar “hinge” creation for decompression of the spinal canal. | Cervical myelopathy with multilevel Spinal stenosis |
| **Cervical disc arthroplasty (CDA)** | Cervical Radiculopathy or Cervical Myelopathy | Also known as cervical artificial disc replacement (CADR). Conservative management should be tried before surgery unless progressive nerve or spinal cord compression resulting in a significant neurologic deficit. Contraindications are severe spondylosis or kyphosis of the cervical spine | Radiculopathy  
Myelopathy |
Bibliography


5. UpToDate, “Evaluation of the adult patient with neck pain. UpToDate, Post TW (Ed), UpToDate, Waltham, MA. (Accessed January, 2021)


33. Levin, K, et. al. Cervical spondylotic myelopathy. UpToDate, Post TW (Ed), UpToDate, Waltham, MA. (Accessed January, 2021)
34. Robinson, J, et. al. Treatment and prognosis of cervical radiculopathy. UpToDate, Post TW (Ed), UpToDate, Waltham, MA. (Accessed January, 2021)
35. Eisen, A, et. al. Disorders affecting the spinal cord. UpToDate, Post TW (Ed), UpToDate, Waltham, MA. (Accessed January, 2021)
This table is a summary of the most common classes and brands of medications used for back and neck pain, including key considerations in terms of class, name, dose, titration, general notes, and cautions/adverse reactions/side effects.

- This table is meant to be used in combination with the Sutter Health Back and Neck Pain Guidelines.
- This table is not meant to be a comprehensive inclusion of all information about each medication. In particular drug-drug interactions are not included in this table.
- Information for this table was mostly obtained from Lexicomp. Please refer to the references and each medications’ package insert, and electronic health record prescribing details and alerts for full information.
- In general, when using medications for back and neck pain
  - Consider evidence regarding risks versus benefits.
  - Provide in combination with education
  - Assess for comorbidities (such as sleep disturbance) due to pain when making treatment decisions.

**1st line for ACUTE and CHRONIC back and neck pain**

**NSAIDs**

<table>
<thead>
<tr>
<th>Name</th>
<th>Initial Daily Dose</th>
<th>Titration</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Selective</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ibuprofen</td>
<td>400mg–800mg q8 PRN</td>
<td>Max dose 3200 mg/day</td>
<td>Not recommended for chronic therapy</td>
</tr>
<tr>
<td>Naproxen</td>
<td>250–500mg q12h PRN</td>
<td>Max dose 1500 mg/day</td>
<td></td>
</tr>
<tr>
<td><strong>Non-Selective</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Celecoxib</td>
<td>100 mg q 12h PRN</td>
<td>Max 400 mg/day</td>
<td>may be associated with reduced risk of GI adverse effects and renal toxicity</td>
</tr>
</tbody>
</table>

See Lexicomp for dosing and notes for other selective and non-selective NSAIDS

**General Notes:**

- Use as first line treatment of acute and chronic lower back pain for patients without contraindications
- Use lowest dose for shortest time possible. Consider a 2-4 week trial before moving to 2nd line medicines.
- Generally, use non-selective NSAIDS.
- If ibuprofen or naproxen are not effective, consider switching to another NSAID before moving to 2nd or 3rd line. Different NSAIDS may have different effects due to variations in mechanism of action.
- Celecoxib may be associated with reduced risk of GI adverse effects and renal toxicity.
- If an NSAID is required in a patient with GI risk, prescribing with a proton pump inhibitor may be a viable option

**Black Box Warning:** increased risk of CV events.

**Cautions:**

- Use with caution in patient with renal dysfunction, gastritis, peptic ulcer disease, history of GI bleed, CV comorbidities, gout, and patient on anticoagulation

**Adverse Reactions/Side Effects:**

- Side effects: GI upset/irritation, hepatic and renal dysfunction, fluid retention, hypersensitivity reactions, and cardiovascular events in high risk patients
Acetaminophen

<table>
<thead>
<tr>
<th>Name</th>
<th>Initial Dose</th>
<th>Titration</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophen</td>
<td>650mg q6h PRN</td>
<td>Limit dose to 3000 mg per in 24 hrs</td>
<td>Dose limit applies to all sources of APAP including OTC</td>
</tr>
</tbody>
</table>

**General Notes:**
- Can be tried as first line therapy for acute pain if treatment with NSAIDs is not appropriate. However, some studies have shown no effectiveness against placebo
- Does not have anti-inflammatory effect
- Avoid use in chronic back pain.

**Black Box Warning:** Fetal injury and death. Discontinue as soon as possible when pregnancy detected

**Cautions:**
- Risk of hepatotoxicity. Limit dose to 3000 mg in 24 hours
- For patient with liver disease or alcohol use disorder, limit to short term use at dose less than 2000 mg in 24 hours

**Adverse Reactions/Side Effects:**
- Study in low back pain showed no more side effects than placebo

---

**2nd line for ACUTE back and neck pain**

**Skeletal Muscle Relaxants**

<table>
<thead>
<tr>
<th>Name (Brand)</th>
<th>Initial Daily Dose</th>
<th>Max Dose</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclobenzaprine</td>
<td>5mg q8h prn</td>
<td>Max 30mg/d</td>
<td>Not preferred in patients who have a history of arrhythmias or who are concurrently taking medications that also may prolong QTc 2. Use not recommended in patients &gt; 65 years of age per American Geriatrics Society 2015 Updated Beers Criteria</td>
</tr>
<tr>
<td>Baclofen</td>
<td>5mg TID</td>
<td>Max 80mg/day</td>
<td>Boxed warning to taper use with discontinuation to prevent seizures</td>
</tr>
<tr>
<td>Metaxalone</td>
<td>800mg TID</td>
<td>Max 3200mg/day</td>
<td>Contraindicated in severe hepatic and renal dysfunction. Use not recommended in patients &gt; 65 years of age per American Geriatrics Society 2015 Updated Beers Criteria</td>
</tr>
<tr>
<td>Carisoprodol (Soma)</td>
<td>Not recommended</td>
<td>Not recommended</td>
<td>Due to risk of abuse/dependence</td>
</tr>
</tbody>
</table>

**General Notes:**
- May be used as adjacent therapy for acute pain if NSAIDs and/or acetaminophen are not effective
- Effective for short term pain relief
- Insufficient evidence that they are effective in subacute or chronic lower back pain
- Use lowest dose for shortest time possible (such as limit to a 7-day course)
- Not better than Tylenol or NSAIDs alone
- Insufficient evidence to recommend one over the other.

**Cautions:**
- Use with caution in elderly due to fall risk and sedation

**Adverse Reactions/Side Effects:**
- Drowsiness, dizziness, light-headedness, fatigue and sedation
- Hepatotoxicity (usually reversible) associated with tizanidine
- Abrupt discontinuation of tizanidine may induce a hyperadrenergic syndrome that can include reflex tachycardia and hypertension, tremor, anxiety and hypertonicity.
- Long term use associated with QT prolongation
### 2nd line for CHRONIC back and neck pain

**Selective serotonin and norepinephrine reuptake inhibitor antidepressant**

<table>
<thead>
<tr>
<th>Name (Brand)</th>
<th>Initial Daily Dose</th>
<th>Titration</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duloxetine delayed release</td>
<td>30 mg daily</td>
<td>Max dose 60 mg/d</td>
<td>Avoid with hepatic impairment</td>
</tr>
</tbody>
</table>

**General Notes:**
- Duloxetine is the only medication. May be considered for chronic low back pain (may have additional benefit in patient with coexisting depression)
- Increase dose weekly, takes 4-6 weeks for onset of action.
- To discontinue, gradual taper over 2-4 weeks.
- Better than placebo for chronic pain

**Adverse Reactions/Side Effects:**
- Risk of serotonin syndrome

### 3rd line for ACUTE back and neck pain

**Tramadol**

<table>
<thead>
<tr>
<th>Name (Brand)</th>
<th>Initial Dose</th>
<th>Titration</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tramadol</td>
<td>50mg q6h PRN</td>
<td>Max 400 mg/d</td>
<td>25 to 50 mg TID may be sufficient for patients with moderate acute pain</td>
</tr>
</tbody>
</table>

**General Notes:**
- May be consider for short term use in acute low back pain if other medications are not effective
- Use lowest dose for shortest time possible
- Insufficient evidence to support the use of tramadol for the treatment of chronic pain

**Cautions:**
- Has been associated with the risk of addiction, physical dependence, and tolerance.
- Avoid or use with caution in patients taking certain antidepressants due to serotonin syndrome
- Contraindicated if history of seizure

**Side Effects:**
- Constipation, somnolence, dizziness, nausea, vomiting, and pruritus
4th line for ACUTE back and neck pain

Opioids

<table>
<thead>
<tr>
<th>Name (Brand)</th>
<th>Initial Dose</th>
<th>Titration</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please see Lexicomp for full information about brands, dose, titration and notes

General Notes:
- May be considered for short term use in severe acute low back pain if other medications are contraindicated or not effective
- Insufficient evidence to support the use of opioid for the treatment of chronic low back pain
- Individual risk assessment should be performed prior to the initiation of opioids due to the potential for addiction. Avoid use if risks outweigh benefits
- Use lowest dose for shortest time possible
- Not better than Tylenol or NSAIDs alone
- Avoid abrupt withdrawal
- Avoid use with tramadol due to risk of side effects, dependency, abuse, longer disability

Cautions:
- Risk of drug abuse/dependence

Adverse Reactions/Side Effects:
- Constipation, nausea, vomiting, sedation, and pruritus. Less common effects include dry mouth, mental confusion, urinary retention, and respiratory depression.

Other medications

<table>
<thead>
<tr>
<th>Name (Brand)</th>
<th>Indication</th>
</tr>
</thead>
</table>
| Topical Diclofenac | May be considered for the treatment of acute musculoskeletal pain  
Insufficient evidence to support use for chronic pain  
NOTES:  
- Available OTC  
- The average amount systemically absorbed is 6% of the oral form |
| Topical Capsaicin | May be considered on a short-term basis for acute pain (3 months or less). |
| Topical Lidocaine Patch 5% | Not known to be effective for back or neck pain.  
Available over-the-counter in a 4% patch formulation. |
| Antidepressants  
(other than duloxetine) | Not known to be effective for back pain  
Low dose TCA may be considered for chronic neck pain  
Low dose TCA may be considered for sleep disturbance |
| Anticonvulsants | Not known to be effective for the treatment of low back pain or radicular back pain.  
May be considered for chronic neck pain  
May be considered for overlapping pain syndromes or chronic neck pain |
| Steroids | Not recommended for back or neck pain  
May occasionally be used by specialist for radiculopathy  
NOTES:  
- If used with NSAIDs consider prophylaxis against gastrointestinal bleeding  
- Side effects include elevated blood pressure, mood disorders, psychosis, insomnia, gastritis, ulcer formation, gastrointestinal bleeding, hyperglycemia, bone loss, and heightened risk of typical infections |
Bibliography: Medication Tables

8. National Institute for Health and Care Excellence (NICE) Low back pain and sciatica in over 16s: assessment and management
10. Chao, R. et.al Subacute and chronic low back pain: Nonsurgical interventional treatment UpToDate, Post TW (Ed), UpToDate, Waltham, MA. (Accessed January, 2021)
15. Levin, K, et. al. Acute lumbosacral radiculopathy: Treatment and prognosis, UpToDate, Post TW (Ed), UpToDate, Waltham, MA. (Accessed January, 2021)
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1C</td>
<td>Hemoglobin A1C</td>
</tr>
<tr>
<td>BP</td>
<td>Blood Pressure</td>
</tr>
<tr>
<td>CAD</td>
<td>Coronary artery disease</td>
</tr>
<tr>
<td>CADR</td>
<td>cervical artificial disc replacement</td>
</tr>
<tr>
<td>CBT</td>
<td>Cognitive Behavioral Therapy</td>
</tr>
<tr>
<td>CDA</td>
<td>Cervical disc arthroplasty</td>
</tr>
<tr>
<td>CM</td>
<td>Chiari malformation</td>
</tr>
<tr>
<td>CNS</td>
<td>Central Nervous System</td>
</tr>
<tr>
<td>COPD</td>
<td>Chronic Obstructive Lung Disease</td>
</tr>
<tr>
<td>CRP</td>
<td>C-Reactive Protein</td>
</tr>
<tr>
<td>CT</td>
<td>Computed Tomography</td>
</tr>
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