Neck Pain, Chronic: Idiopathic

Indexing Metadata/Description

› Title/condition: Neck Pain, Chronic: Idiopathic
› Synonyms: Chronic cervicalgia, idiopathic; neck pain, chronic, nontraumatic; trapezius myalgia, idiopathic; neck tension syndrome, idiopathic; mechanical neck disorder, idiopathic; chronic nonspecific neck pain; chronic cervicalgia; trapezius myalgia; neck tension syndrome; mechanical neck disorder; chronic idiopathic neck pain
› Anatomical location/body part affected: Cervical and upper thoracic spine and supporting soft tissue structures
› Area(s) of specialty: Orthopedic rehabilitation, sports rehabilitation

Description

• Chronic neck pain (CNP) is a musculoskeletal disorder characterized by reduced cervical muscle activation and mobility during both cognitive tasks and functional activities\(^1,2\)

• See Clinical Review...Neck Pain, Chronic: Whiplash; Accession Number: 5000010259 for a review of chronic neck pain in persons with whiplash-associated disorders

› ICD-9 code: 723.1 cervicalgia
› ICD-10 code: M54.2 cervicalgia

(ICD Codes are provided for the readers’ reference, not for billing purposes)

› G-Codes

• Changing & Maintaining Body Position G-code set
  – G8981, Changing & maintaining body position functional limitation, current status, at therapy episode outset and at reporting intervals
  – G8982, Changing & maintaining body position functional limitation, projected goal status, at therapy episode outset, at reporting intervals, and at discharge or to end reporting
  – G8983, Changing & maintaining body position functional limitation, discharge status, at discharge from therapy or to end reporting

• Carrying, Moving & Handling Objects G-code set
  – G8984, Carrying, moving & handling objects functional limitation, current status, at therapy episode outset and at reporting intervals
  – G8985, Carrying, moving & handling objects functional limitation, projected goal status, at therapy episode outset, at reporting intervals, and at discharge or to end reporting
  – G8986, Carrying, moving & handling objects functional limitation, discharge status, at discharge from therapy or to end reporting

• Self Care G-code set
  – G8987, Self care functional limitation, current status, at therapy episode outset and at reporting intervals
  – G8988, Self care functional limitation, projected goal status, at therapy episode outset, at reporting intervals, and at discharge or to end reporting
  – G8989, Self care functional limitation, discharge status, at discharge from therapy or to end reporting
• Other PT/OT Primary G-code set
  – G8990, Other physical or occupational primary functional limitation, current status, at therapy episode outset and at reporting intervals
  – G8991, Other physical or occupational primary functional limitation, projected goal status, at therapy episode outset, at reporting intervals, and at discharge or to end reporting
  – G8992, Other physical or occupational primary functional limitation, discharge status, at discharge from therapy or to end reporting

• Other PT/OT Subsequent G-code set
  – G8993, Other physical or occupational subsequent functional limitation, current status, at therapy episode outset and at reporting intervals
  – G8994, Other physical or occupational subsequent functional limitation, projected goal status, at therapy episode outset, at reporting intervals, and at discharge or to end reporting
  – G8995, Other physical or occupational subsequent functional limitation, discharge status, at discharge from therapy or to end reporting

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Source: https://www.cms.gov/

▶ Reimbursement: No specific issues or information regarding reimbursement for initial treatment of CNP have been identified; however, use caution with non-finalized cases of worker’s compensation or third party insurance claims

▶ Presentation/signs and symptoms
  • Mechanical neck pain with impaired cervical mobility for more than 1 month
  • Cervicogenic headache(5,6)
  • Pain-restricted active and passive range of motion (ROM)(7)
  • Cervical muscle weakness(7)
  • Forward head posture(44)
  • Work-related stress and disability(8)
  • Sleep disturbance(5,6)
  • High body mass index (BMI) consistent with obesity(3)
  • Impaired proprioception and balance(44)

Causes, Pathogenesis, & Risk Factors

▶ Causes
  • Idiopathic and various factors may interact to cause CNP; however, causal relationships remain undetermined
  – Increased muscle tension due to stress, anxiety, and fatigue
  – Poor posture causing increased soft tissue strain and muscle spasm
– Nerve root irritation due to postural impairments and joint/disc degeneration
– Degenerative disc and joint changes placing increased stress on facet joints or soft tissue and nerve root irritation
– Shoulder impingement
– Ossified stylohyoid ligament complex

Pathogenesis
• Gradual onset, unlike in patients with traumatic neck injuries such as whiplash, which generates a different pattern of CNP

• Hypothetical etiological mechanisms
  – Static neck postures: cause cervical muscle strain, which increases tension and stiffness leading to pain-restricted ROM
  – CNP: reduces cervical muscle activation, as indicated by low electromyographic amplitude and fatigue in:
    - Deep cervical flexors (longus colli and longus capitis). Reduced activation of cervical flexors occurs during both cognitive tasks and functional movement
    - Anterior scalene and sternocleidomastoid
  – Abnormal depolarization of motor end plates: may promote myofascial trigger points or “contraction knots”
  – Changes in motor control: cervical motion is altered in CNP, even though head position sense is not
  – Impaired cervical ROM: associated with postural changes (in seated position), including reduced extension in the upper cervical spine and reduced flexion in the lower cervical spine

Risk factors
• Sedentary lifestyle/physical inactivity
  – “Trapezius myalgia” prevalent in computer workers
• Increased use of computers
  – There is limited evidence to support an association between computer work and CNP
  – CNP is associated with occupational stress and increased neck muscle tension
  – In theory, persistent neck muscle fatigue results from poor static posture of the head and shoulders
  – Substandard workspace ergonomics may contribute to increased cervical muscle tension
• Restricted cervical ROM

Overall Contraindications/Precautions
• Notify the referring physician if the patient presents with any signs of acute illness: fever, chills, night sweats, nausea, vomiting, diarrhea
• Following orthopedic procedures, it is important to educate the patient and caregivers on the difference between normal postoperative pain and abnormal findings (e.g., infection, bleeds)
• See specific Contraindications/precautions to examination and Contraindications/precautions under Assessment/Plan of Care

Examination
• Contraindications/precautions to examination
• History taking and examination procedures may vary depending on the age of the patient, time elapsed since the initial injury, and current circumstances in which the patient is presenting for evaluation; modify as indicated
• It is important to respect the patient’s subjective complaints of pain during evaluation and treatment. If the patient complains of increased pain and/or the physical therapist (PT) observes increased swelling or decreased ROM during physical therapy or tenderness upon joint palpation, further examination and/or special tests should be considered
• Consult with the referring surgeon regarding any contraindications and specific orders for treatment intervention following cervical spine surgery
• Notify and consult with referring physician on positive findings for:
  – Spinal derangement
    - Spurling’s test
    - Jackson’s compression test
    - Shoulder abduction test
- Upper motor neuron disease
  - Hoffmann’s sign
  - Babinski sign
- Vertebral artery insufficiency test

History

- **History of present injury**
  - **Mechanism of injury**
    - When did the symptoms first begin? How long have they been present? How have they progressed since onset?
      - Typically, CNP is a gradual onset of reduced cervical mobility and pain

- **Course of treatment**
  - **Medical management:** What medical treatment intervention has occurred? Document any current treatment plan. Who comprises the medical team?
  - **Medications for this injury:** Determine what medications were prescribed and what medications are currently being taken. Are the medications effective for pain relief?
    - Nonsteroidal anti-inflammatory drugs (NSAIDs) are commonly taken for pain
    - Sleep disturbances may be treated with agents such as zolpidem (Ambien), clonazepam (Klonopin), and trazodone (Desyrel)
    - Evidence is lacking to support botulinum toxin intramuscular injections for reducing CNP and associated disability, or to improve quality of life \(^{(17)}\)
    - Evidence is lacking to support injection of local anesthetics for relief of CNP \(^{(38)}\)
  - **Diagnostic tests completed:** Document the results of plain radiographs and any imaging studies of the neck. Patients with normal x-ray findings and no neurological signs/symptoms need no further imaging studies \(^{(18)}\)
    - American College of Radiology guidelines, as of 2013, recommend that patients with CNP initially undergo anterior/posterior and lateral radiographs of the cervical spine and, in select cases, open mouth and swimmer’s views. Oblique views are no longer recommended as a standard part of the initial radiographs. Additional recommendations are: \(^{(41)}\)
      - Patients with normal radiographs and no neurologic signs or symptoms need no further imaging
      - Those with normal radiographs and neurologic signs and symptoms should undergo cervical magnetic resonance imaging (MRI) that includes the craniovertebral junction and upper thoracic region
      - Computer tomography (CT) or CT myelography might be recommended for those who are claustrophobic or for whom an MRI is contraindicated
      - Discography is not recommended
    - **Home remedies/alternative therapies:** Document any use of home remedies (e.g., ice or heating pack) or alternative therapies (e.g., massage, acupuncture) and whether or not they helped. Does the patient use a cervical collar or a cervical traction device?
    - **Previous therapy:** Has patient had physical therapy, dry needling, chiropractic for this or related conditions? What specific treatments were helpful or not helpful?
  - **Aggravating/easing factors** (and length of time before the symptoms come on or are eased)
    - Aggravating factors may include work-related static head postures
    - Easing factors may involve stretching, massage, and relaxing the neck
  - **Body chart:** Use body chart to document location and nature of symptoms
  - **Nature of symptoms:** Document nature of symptoms (e.g., constant vs. intermittent, sharp, dull, aching, burning, numbness, stiffness, tingling). Patients may experience neurogenic pain as well as mechanical, referred, or radicular pain depending on the cause
    - The pain is more often constant vs. intermittent, dull and aching vs. sharp
  - **Rating of symptoms:** Use a visual analog scale (VAS) or 0-10 scale to assess symptoms at their best, at their worst, and at the moment (specifically address if pain is present now and how much)
  - **Pattern of symptoms:** Document changes in symptoms throughout the day and night, if any (A.M., mid-day, P.M., night); also document changes in symptoms due to weather or other external variables
  - **Sleep disturbance:** If present, document the number of wakings/night. Inquire about sleep position and number of pillows
– Other symptoms: Document other symptoms the patient may be experiencing that could exacerbate the condition and/or symptoms that could be indicative of a need to refer to physician (e.g., severe headaches, dizziness, temporomandibular pain, night sweats, swelling, loss of weight, rash)

– Barriers to learning
  - Are there any barriers to learning? Yes __ No __
  - If Yes, describe ______________________ (e.g., foreign language)

• Medical history
  – Past medical history
  - Previous history of neck problems: Document prior injuries that may be related to this condition. Any surgical intervention or injection therapy?
  - Comorbid diagnoses: Ask patient about comorbidities, including diabetes, cancer, heart disease, complications of pregnancy, psychiatric disorders, neurologic deficits, autoimmune disorders, musculoskeletal disorders, etc.
  - Medications previously prescribed: Obtain a comprehensive list of medications prescribed and/or being taken (including over-the-counter drugs). Is there a history of substance abuse? Smoking?
  - Other symptoms: Ask patient about other symptoms he or she may be experiencing, such as visual impairments, hearing loss, dizziness, nausea, headaches, fainting. Dysarthria, dysphagia, drop attacks (fainting), double vision and dizziness are known as “the five D’s” and are signs of vertebral artery insufficiency. All neck patients should be questioned about the above symptoms

• Social/occupational history
  – Patient’s goals: Document what the patient hopes the therapy will accomplish and in general
  – Vocation/avocation and associated repetitive behaviors: Does the patient attend school (home/traditional setting)? Does the patient work inside/outside of the home? If so, what are the job duties? Is the patient currently on work disability? Does the patient drive? Does the patient participate in recreational or competitive sports? Is the patient involved in leisure activities and/or community programs?
  – Functional limitations/assistance with ADLs/adaptive equipment: What ADLs can the patient perform independently?
  – Living environment: Identify if there are barriers to independence in the home and whether any modifications are necessary (e.g., stairs, number of floors in home, lack of caregivers). With whom does the patient live (siblings, caregivers, spouse)?

• Relevant tests and measures: (While tests and measures are listed in alphabetical order, sequencing should be appropriate to patient medical condition, functional status, and setting)
  • Anthropometric characteristics: Document patient’s height, weight, and BMI
  • Assistive and adaptive devices: Assess patient for trial of orthopedic pillow, especially in cases of sleep disturbance with morning neck pain and stiffness. Assess patient’s work station for ergonomic chair and desk
  • Balance: Assess static and dynamic sitting and standing balance. Use the Berg Balance Scale (BBS)
    – In a 2013 systematic review, researchers concluded that patients with idiopathic neck pain (INP) or whiplash-associated disorders (WADs) have balance and proprioception impairments compared to controls. There was a statistically significant difference for at least one balance impairment measurement in patients with INP and WAP in 11 of the 12 studies included
  • Body mechanics and ergonomics: Assess patient’s ability to maintain proper body mechanics with lifting and carrying. Re-create patient’s work environment and assess his or her ergonomic set-up
  • Cranial/peripheral nerve integrity
    – Assess myotomes of upper extremity: neck flexion (C1-C2), neck lateral flexion (C3), shoulder elevation (C4), shoulder abduction (C5), elbow flexion/wrist extension (C6), elbow extension/wrist flexion (C7), thumb extension/ulnar deviation (C8), and hand intrinsics (T1)
    – Assess upper limb neural tension for ulnar, median, and radial nerves and compare bilaterally
  • Joint integrity/mobility: Assess cervical and thoracic joint mobility and note each level as hypo/hypermobile or normal. Assess shoulder joint mobility as part of cervical scan and note any joint restrictions/limitations. Note any symptom reproduction with joint mobility testing
  • Muscle strength: Assess cervical and bilateral upper extremity muscle strength using manual muscle testing (MMT)
  • Observation/inspection/palpation
    – Palpate cervical, thoracic, and bilateral shoulder soft tissue structures. Note any tenderness to palpation, increased tissue tension, or symptom reproduction
A VAS can be used to assist with quantification of symptoms
Musculature may feel tight and fibrous along due to adhesions or contraction knots
The superficial cervical muscles (trapezius, levator scapulae, anterior and medial scalenes, semispinalis capitis, sternocleidomastoid) and deep cervical flexors (longus colli and longus capitis) often have tender points
Note location of any surgical scars and healing stage

• **Posture**
  – Assess patient’s postural alignment in sitting and standing, in particular the position of the head, neck, shoulders, and scapulae
  – Assess for loss of normal cervical lordosis

• **Range of motion**: Assess active and passive cervical and bilateral shoulder ROM of the cervical spine

• **Reflex testing**: Assess bilateral upper extremity deep tendon reflexes. If there is any concern for myelopathy, assess lower extremity reflexes and Upper Motor Neuron signs

• **Sensory testing**: Assess cervical and bilateral upper extremity dermatomes for light touch, sharp dull, and thermal (warm and cold) sensation

• **Special tests**
  – *Compression test* – With patient sitting, examiner presses straight down on patient’s head; test positive if reproduces patient’s pain
  – *Distraction test* – With patient supine, examiner applies distractive force while slightly flexing patient’s neck. Positive if pain is reduced
  – *Spurling’s test* – With patient sitting, examiner passively side bends and rotates head to one side and applies overpressure; test positive if pain radiates into ipsilateral arm
  – *Shoulder abduction test* – With patient sitting, examiner passively places patient’s hand on patient’s head; test positive if patient’s referred symptoms decrease
  – *Vertebral artery Insufficiency (VBI) test* – Minimum level of assessing VBI consists of sustained end range rotation to one side. Patient remains in the position for 10 seconds and is assessed for nystagmus and dizziness. Patient returns back to neutral for ten seconds. Repeat on opposite side. To further assess VBI, examiner might move patient’s head into cervical extension and lateral flexion; examiner then rotates head to same side and holds position for 10 seconds
  – *Hoffmann’s sign (finger flexor test)* – Examiner taps or flicks the terminal phalanx or nail of the 3rd or 4th finger; test positive if terminal phalanx of thumb flexes
  – *Short Form 36 (SF-36) Health Survey* - Quality of life measurement

**Assessment/Plan of Care**

› **Contraindications/precautions**
  – Clinicians should follow the guidelines of their clinic/hospital and what is ordered by the patient’s physician. The summary below is meant to serve as a guide, not to replace orders from a physician or a clinic’s specific protocols
  – Only those contraindications/precautions applicable to this diagnosis are mentioned below, including with regard to modalities. Rehabilitation professionals should always use their professional judgment

• **Cryotherapy** contraindications
  – Raynaud’s syndrome
  – Cryoglobulinemia
  – Cold urticaria
  – Paroxysmal cold hemoglobinuria
  – Impaired circulation
  – Over area of nerve regrowth

• **Cryotherapy** precautions
  – Hypertension – cold can lead to an increase in blood pressure
  – Hypersensitivity to cold
  – Avoid aggressive treatment with cold modalities over an acute wound

• **Thermotherapy** contraindications
  – Decreased circulation
  – Decreased sensation
– Acute/sub-acute traumatic and inflammatory conditions
– Skin infections
– Impaired cognition or language barrier
– Tumor present
– Tendency for hemorrhage or edema
– Heat rubs

• Electrotherapy contraindications/precautions (in some cases, when approved by the treating physician, electrotherapy may be used under some of the circumstances listed below when benefits outweigh the perceived risk)(19)
  – Stimulation through or across the chest
  – Cardiac pacemakers
  – Implanted stimulators
  – Over carotid sinuses
  – Uncontrolled hypertension/hypotension
  – Peripheral vascular disease
  – Thrombophlebitis
  – Pregnancy
  – Over pharyngeal area
  – Diminished sensation
  – Acute inflammation
  – Seizure history
  – Confused patients
  – Immature patients
  – Obesity
  – Osteoporosis
  – Cancer
  – Used in close proximity to diathermy treatment

• Therapeutic ultrasound contraindications(19)
  – Over the region of a cardiac pacemaker
  – Over the pelvis, abdominal and lumbar regions during pregnancy
  – Over the eyes and testes
  – In area with infection or bleeding
  – If a tumor is present in the area
  – In the area of a deep vein thrombosis (DVT) or thrombophlebitis
  – Over the heart, stellate or cervical ganglia
  – Over epiphyseal plates

• Therapeutic ultrasound precautions(19)
  – Sensory deficits
  – Individuals who cannot communicate effectively (e.g., impaired cognition, language barrier)
  – Circulatory impairments
  – Plastic or metal implants
  – Note: Always decrease ultrasound intensity if the patient complains of discomfort

› Diagnosis/need for treatment: Physical therapy is needed to restore cervical ROM; improve cervical, thoracic, and upper extremity muscle strength and endurance; improve functional mobility; provide patient education regarding proper body mechanics and ergonomics; reduce complaints of pain; and improve quality of life

› Rule out (20)
  • Cervical fracture/dislocation
  • Spinal cord injury
  • Osteoarthritis
  • Degenerative/herniated cervical disc disease
  • Cervical radiculitis/radiculopathy
  • Myelopathy
  • Shoulder impingement
• Fibromyalgia
• Infection/inflammation
• Malignancy
• Congenital cervical malformation (e.g., Klippel-Feil syndrome)
• Rheumatoid arthritis

Prognosis
• The estimated lifetime prevalence of chronic neck syndromes is about 50%, although fewer than half of those afflicted seek medical attention.[21]
• In a Netherlands primary care population (N = 329, ages 18 to 70), younger age, lower pain intensity, and absence of low back pain were associated with better outcomes at the end of treatment period (exercise therapy or manual therapy) and at 52 weeks follow-up.[22]
• Untreated depression is associated with lower quality of life, decreased work function, and increased health care utilization.[23]
• Psychological and secondary gain issues can negatively impact outcomes.[21]

Referral to other disciplines
• Physician for recalcitrant pain
• Ergonomist for workplace evaluation
• Acupuncturist for pain management
• Personal trainer for home/gym exercise supervision
• Psychologist for anxiety/depression
• Dietitian for weight management, as indicated
• Ergometric assessment of workplace, as indicated

Other considerations
• Based on a three-group randomized controlled trial in the U.K. acupuncture sessions and the Alexander technique lessons led to significant reduction in CNP and disability compared with usual care at 12 month follow-up.[46]
  –The Alexander technique is an education series of self-care to reduce habits of poor posture, excessive muscle tension, stress, pain, and malcoordination
  –517 participants with an average duration of 6 years of neck pain were randomized into three groups. The first group averaged 10 acupuncture sessions plus usual care, the second group had 14 Alexander lessons plus usual care, and the third group usual care only.
  –Primary outcome measure analysis utilizing the Northwick Park Questionnaire (NPQ) showed an overall 32% reduction for the acupuncture group and a 31% reduction for Alexander lesson group compared with 23% for the usual care group
• A systematic review of literature of cognitive-behavioral therapy (CBT) as a treatment option for individuals with subacute and chronic neck pain overall were not clinically meaningful and had a low quality of evidence.[47]
  –CBT was shown to induce statistically significant changes in short-term pain relief and disability in patients with chronic neck pain when compared to no treatment. On subacute neck pain, a statistically significant effect was found on pain relief but not disability when compared to other types of treatments
• Cognitive factors (e.g., pain-related fear, pain vigilance/awareness, self-efficacy, catastrophizing beliefs) were strongly related to levels of pain and disability in 94 patients with CNP.[24]

Treatment summary
• Exercise therapy is an important component of effective pain management in CNP.[2-4] A home program for self-management of pain, including therapeutic/functional exercises, should be instructed and given to patients to perform on a daily basis
• Based on a 2007 systematic review of the literature (88 randomized controlled trials included) on the efficacy of conservative treatment for CNP, the only treatment with strong evidence of benefit was a multimodal approach that included stretching, strengthening, and mobilization/manipulation. The benefits included reduced pain, improved function, and global perceived effect.[35]
  –Based on a 2007 systematic review of the literature (88 randomized controlled trials included) on the efficacy of conservative treatment for CNP, interventions with moderate evidence of benefit are the following:[35]
    –Neck strengthening and stretching exercises
    –Low-level laser therapy
Low-frequency pulsed electromagnetic field (but not long-term effects)

Intermittent traction

Acupuncture (but not long-term effects)

Therapeutic exercises

Moderate quality evidence supports combined cervical and scapulothoracic muscle strengthening and stretching to reduce pain and tenderness, as well as to improve functional outcomes, in persons with CNP.\(^{7,8,15,25,26,27,28}\)

The addition of specific neck strengthening exercises to a treatment regimen may be more effective than just stretching and aerobic exercise in reducing pain and disability.\(^{7,26,27}\)

Based on a 2012 Cochrane Review of 21 trials,\(^{25}\)
- Moderate quality evidence indicates that combined cervical, scapulothoracic stretching and strengthening are beneficial for pain relief immediate post treatment and at intermediate follow-up; it also improved function short term and intermediate term for CNP
- Low to moderate quality evidence indicates that upper extremity stretching and strengthening or a general exercise program are not beneficial for improving outcomes in patients with CNP
- A yoga (Iyengar) program can reduce nonspecific CNP and improve quality of life.\(^{42}\)
  - Based on a study conducted in Germany in which 51 patients were randomized to either a traditional home-based exercise program or yoga program
    - 82.4% of the patients were females and the median age of all participants was 47.8 years
    - The yoga group attended a 9-week yoga course (90 minutes, once a week). Emphasis was on strengthening and lengthening the neck and shoulder muscles and improving neck stability and overall posture. Patients were instructed to practice their yoga exercises at home for 10 minutes a day
    - The exercise group received a self-care exercise manual and was instructed to practice exercises 10 minutes daily
    - Patients in the yoga group reported significantly less neck pain and disability and greater quality of life as measured by the NDI and SF-36 compared to the exercise group. ROM and proprioceptive acuity improved significantly in the yoga group compared to the exercise group. There was no significant change in ROM, proprioceptive acuity, disability, or quality of life in the exercise group pre and post intervention
  - Patients who participated in neck strengthening and endurance exercises maintained the positive gains in ROM, strength, and pressure pain threshold at 3 years post-initial treatment intervention
    - Finnish researchers conducted a randomized controlled trial that included 118 women with nonspecific CNP
    - Patients participated in neck strengthening and endurance exercises and were followed-up at 12 months and 3 years to reassess neck pain, disability, ROM, and pain pressure threshold
    - There were no additional statistically significant improvements made between the 12-month follow-up and 3-year follow-up; however, the improvements recorded at the 12-month follow-up were maintained at the 3-year follow-up
    - Researchers concluded that a 12-month exercise program is adequate to maintain long-term effects and exercises may not need to be performed regularly for the remainder of the subject’s lifetime.\(^{27}\)

Gentle training of the deep cervical flexors (longus capitis and longus colli were targeted) increased their activation, improved cervical angle in sitting, and reduced VAS pain ratings compared to “endurance-strength” training of the dominant superficial flexors (anterior scalene and sternocleidomastoid).\(^{2,28,29,30,48}\)

Researchers in Korea investigated the effects of neurac (neuromuscular activation) training on pain, function, fatigability, balance ability, and quality of life with CNP patients.\(^{49}\)
- Neurac consists of tailored exercises and techniques in suspension slings which aim to restore pain-free and functional movement patterns through high levels of neuromuscular stimulation
- Twenty subjects with neck pain for at least 3 months; 10 in the experimental group and 10 in the control group participated. Neurac training was conducted 3 times per week for 4 weeks
- VAS and NDI scores, sway length and velocity with eyes open and closed, and fatigue symptom scores all decreased significantly

Manual therapy

Manual nonmanipulative mobilization techniques (not including massage) may reduce pain.\(^{31}\) and mobilization plus exercise appears to provide greater long-term benefits.\(^{4}\)

In a 2010 systematic review that included 17 randomized controlled trials, researchers concluded the following:\(^{32}\)
High-quality evidence indicates that manual therapy and exercise therapy separately provide the same long-term (12 months) positive outcomes in persons with acute or chronic neck pain, even though manual therapy is associated with more immediate (4 weeks) pain relief.

Moderate-quality evidence indicates greater pain reduction and improved QOL when exercise and manual therapy are combined than for manual therapy alone.

Manipulation of the cervical and thoracic spine can improve disability related to chronic mechanical CNP but not necessarily improve ROM or pain in the short term.

Based on a randomized controlled study conducted in the United States in which 82 patients were assigned to a cervical spine manipulation group or a full manipulation group that received mid-cervical, cervico-thoracic, and thoracic joint manipulations.

Neck pain intensity, NDI, and cervical ROM were calculated at baseline and 1 week following joint manipulation.

Patients who received the full manipulation reported greater reduction in disability than those in the cervical group, whereas both groups reported similar reduction in neck pain and increases in cervical ROM.

The addition of thoracic spine thrust manipulations to non-thrust cervical manipulations can improve short-term outcomes in patients with CNP.

Based on a randomized trial that compared 2 groups but did not include controls.

The experimental group received spinal thrusts (x2) targeted to T1-T3 and T4-T7 in one treatment session while the comparison group received only the non-thrust cervical manipulation.

Numeric pain and disability ratings improved more in the experimental group than the comparison group at 1-week follow-up.

Therapeutic modalities

- Warm or cold modalities (according to patient preference) can be used to reduce pain and enhance relaxation of tight neck and upper back muscles prior to exercise or manual therapy.

- A 2013 Cochrane systematic review and meta-analysis included 20 small randomized controlled trials that assessed the short-, intermediate-, and long-term effects of electrotherapy as a modality to reduce pain and improve function, quality of life, and disability in adults with CNP (with/without radiculopathy or cervicogenic headaches).

- Researchers were unable to make any definite statements on the efficacy and clinical usefulness of electrotherapy modalities for neck pain since the evidence is of low or very low quality.

- Current evidence indicates that pulsed electromagnetic field therapy (PEMF), repetitive magnetic stimulation (rMS), and transcutaneous electrical nerve stimulation (TENS) were more effective than placebo; however, the evidence was of low or very low quality.

- Galvanic current, iontophoresis, electromagnetic stimulation (EMS), and a static magnetic field did not reduce pain or disability.

Other options

- Use of orthopedic pillow can improve patient outcomes; however, it is not independently effective.

- Based on a randomized controlled trial conducted in Canada that included 151 subjects with CNP.

- Subjects who received neck strengthening exercises in conjunction with the use of an orthopedic pillow achieved the most improvement compared to the subjects that received exercises and placebo (hot/cold packs and massage), exercises, placebo and pillow, or pillow and placebo.

- Evidence is lacking or of poor quality to support workplace intervention for relief of CNP or preventing work-related musculoskeletal disorders in the neck and shoulder.

- Cupping therapy (CT), a traditional Chinese medical treatment, can increase skin surface temperature, decrease blood pressure, and decrease VAS of neck and shoulder pain.

- Based on a single blind experimental design randomized controlled trial in Taiwan of 60 subjects with chronic neck and shoulder pain.
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<td>Thermal modalities for superficial heating or cooling</td>
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<td>Evidence is lacking, limited, or conflicting to support use of electrotherapeutic modalities in treatment of mechanical neck disorders(^{(34)})</td>
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<td>Minimize passive intervention until pain is controlled with therapeutic exercise</td>
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<td>Patient education on occupational risk factors and use of hot or cold packs</td>
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<tr>
<td>Deficits in cervical ROM and strength</td>
<td>Full cervical ROM and strength</td>
<td>Therapeutic modalities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Neck flexion with neutral cervical spine in supine (80% of maximal voluntary contraction, 15 reps x 3 sets); neck extension with neutral cervical spine in sitting (isometric @100% of maximal voluntary contraction, 15 reps x 1 set); dumbbell shrugs (2 kg in each hand, 20 reps x 3 sets).(^{(7,26)})</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Progress intensity and duration of exercises until normal flexibility and strength are achieved</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Daily repetition of exercises. Advise continuation of exercises after discharge(^{(27)})</td>
</tr>
<tr>
<td>Soft-tissue tenderness and adhesions</td>
<td>Normal findings on palpation of neck and upper shoulders</td>
<td>Functional training</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trial of manual, nonmanipulative mobilization techniques, such as myofascial release(^{(31)})</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Improvement should be noted after several treatments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Functional deficits in posture may exacerbate pain and work disability</td>
<td>Symmetry in head/shoulder posture, sitting, and standing</td>
<td>Functional training</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Posture reeducation exercises. Emphasis on deep cervical flexor muscles (longus capitis and longus colli) as well as scapulothoracic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Progress intensity until patient demonstrates normal posture, especially during simulated work activities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provide patient with written instructions regarding functional activities to be performed at home</td>
</tr>
</tbody>
</table>
Morning neck pain and stiffness  | Pain relief and improved neck mobility in AM  | **Prescription, application of devices and equipment**  
Trial of proper-fitting orthopedic pillow at night(28,35)  
| Improvements in sleep quality and morning symptoms  
Ask patient to record pain and stiffness levels before and after starting pillow. Educate patient on lack of evidence to support use of cervical collar or traction  
Work-related stress and anxiety  | Referral for counseling on stress management  | **Psychological counseling**  
Lack of strong evidence to support advice to activate or advice on stress coping skills(36)  
| N/A  
| N/A

### Outcome Measures

- **Desired outcomes**
  - Pain relief
  - Increased neck strength
  - Increased neck mobility and ROM
  - Improved cervical posture
  - Improved cervical function in ADLs
  - Improved quality of life
  - Return to work, as applicable

- **Outcome measures**
  - VAS
  - MMT
  - Reassessment of cervical mobility and ROM
  - Reassessment of posture
  - Patient satisfaction
  - SF-36
  - NDI
  - NPQ

### Maintenance or Prevention

- Continue neck strengthening and postural exercises to maintain improved function(22)
- Ergonomic assessment of workplace for risk factors

### Patient Education

- Mayo Clinic Website, “Neck pain,”
  http://www.mayoclinic.org/diseases-conditions/neck-pain/basics/definition/con-20028772
## Coding Matrix

References are rated using the following codes, listed in order of strength:

<table>
<thead>
<tr>
<th>Code</th>
<th>Type of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>Published meta-analysis</td>
</tr>
<tr>
<td>SR</td>
<td>Published systematic or integrative literature review</td>
</tr>
<tr>
<td>RCT</td>
<td>Published research (randomized controlled trial)</td>
</tr>
<tr>
<td>R</td>
<td>Published research (not randomized controlled trial)</td>
</tr>
<tr>
<td>C</td>
<td>Case histories, case studies</td>
</tr>
<tr>
<td>G</td>
<td>Published guidelines</td>
</tr>
<tr>
<td>RV</td>
<td>Published review of the literature</td>
</tr>
<tr>
<td>RU</td>
<td>Published research utilization report</td>
</tr>
<tr>
<td>QI</td>
<td>Published quality improvement report</td>
</tr>
<tr>
<td>L</td>
<td>Legislation</td>
</tr>
<tr>
<td>PGR</td>
<td>Published government report</td>
</tr>
<tr>
<td>PFR</td>
<td>Published funded report</td>
</tr>
<tr>
<td>PP</td>
<td>Policies, procedures, protocols</td>
</tr>
<tr>
<td>X</td>
<td>Practice exemplars, stories, opinions</td>
</tr>
<tr>
<td>GI</td>
<td>General or background information/texts/reports</td>
</tr>
<tr>
<td>U</td>
<td>Unpublished research, posters, presentations or other such materials</td>
</tr>
<tr>
<td>CP</td>
<td>Conference proceedings, abstracts, presentation</td>
</tr>
</tbody>
</table>

## References


22. Schellingerhout JM, Verhagen AP, Heymans MW. Which subgroups of patients with non-specific neck pain are more likely to benefit from spinal manipulation, physiotherapy, or usual care?. *Pain*. 2008;139(3):670-680. (R)


