

Clinical Practice Implications of the Bone and Joint Decade 2000–2010 Task Force on Neck Pain and Its Associated Disorders

From Concepts and Findings to Recommendations

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Study Design. Best evidence synthesis.

Objective. To provide evidence-based guidance to primary care clinicians about how to best assess and treat patients with neck pain.

Summary of Background Data. There is a need to translate the results of clinical and epidemiologic studies into meaningful and practical information for clinicians.

Methods. Based on best evidence syntheses of published studies on the risk, prognosis, assessment, and management of people with neck pain and its associated disorders, plus additional research projects and focused

literature reviews reported in this supplement, the 12-member multidisciplinary Scientific Secretariat of the Neck Pain Task Force followed a 4-step approach to develop practical guidance for clinicians.

Results. The Neck Pain Task Force recommends that people seeking care for neck pain should be triaged into 4 groups: Grade I neck pain with no signs of major pathology and no or little interference with daily activities; Grade II neck pain with no signs of major pathology, but interference with daily activities; Grade III neck pain with neurologic signs of nerve compression; Grade IV neck pain with signs of major pathology. In the emergency room after blunt trauma to the neck, triage should be based on the NEXUS criteria or the Canadian C-spine rule. Those with a high risk of fracture should be further investigated with plain radiographs and/or CT-scan. In ambulatory primary care, triage should be based on history and physical examination alone, including screening for red flags and neurologic examination for signs of radiculopathy. Exercises and mobilization have been shown to provide some degree of short-term relief of Grade I or Grade II neck pain after a motor vehicle collision. Exercises, mobilization, manipulation, analgesics, acupuncture, and low-level laser have been shown to provide some degree of short-term relief of Grade I or Grade II neck pain without trauma. Those with confirmed Grade III and severe persistent radicular symptoms might benefit from corticosteroid injections or surgery. Those with confirmed Grade IV neck pain require management specific to the diagnosed pathology.

Conclusion. The best available evidence suggests initial assessment for neck pain should focus on triage into 4 grades, and those with common neck pain (Grade I and Grade II) might be offered the listed noninvasive treatments if short-term relief is desired.

Key words: neck pain, therapy, practice guidelines, diagnosis, management.

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This article describes the clinical implications of the findings of the Bone and Joint Decade 2000–2010 Task Force on Neck Pain and Its Associated Disorders (Neck Pain Task Force). The scope of the Neck Pain Task Force was limited to neck pain and its associated disorders. Studies on neck pain that resulted from destructive and progressive pathologies affecting the neck such as fractures and dislocations, myelopathy, infections, rheumatoid arthritis and other inflammatory systematic diseases

and tumors were excluded. In this article, we describe how the Neck Pain Task Force moved from concepts (the conceptual model for the onset, course, and care of neck pain)¹ and factual descriptions of the scientific evidence²⁻¹⁰ to clinical practice recommendations that we hope will inform clinical practice. From the beginning of the Neck Pain Task Force, it was recognized that guidance generated by the Neck Pain Task Force, based on rigorous assessment of the scientifically admissible evidence about the epidemiology, assessment, and management of neck pain and associated disorders, may be helpful in informing the decisions of people with neck pain and their clinicians.¹¹ Guidance that is relevant to a person's circumstances and available options is often more useful than general guidance, but circumstances vary widely. The Neck Pain Task Force approach was to develop and use a conceptual model for the onset, course, and care of neck pain, to select common scenarios and tailor guidance to those.¹

Developing a recommendation implies describing and appraising the pertinent options, their potential benefits and harms, the preferences or relative values attached to these benefits and harms, and their relative costs or resource use.¹²⁻¹⁴ This approach to development of practice recommendations has been clearly articulated in the abundant literature in practice guideline development, including the widely used AGREE instrument and the GRADE framework.^{12,13} Because preferences, values, options, and resources vary from person to person, in many instances the Neck Pain Task Force chose to provide guidance in the form of statements that highlight the evidence a person should consider in making a decision, rather than recommending a particular choice. The Neck Pain Task Force provided a definitive recommendation only where the balance of benefits and harms clearly favored one option for most people with neck pain; otherwise we offered tables and succinct summaries of the options felt acceptable for substantial numbers of people with neck pain.^{1,12}

■ Methods

Development of Concepts

The Neck Pain Task Force Conceptual Model for the onset, course, and care of Neck Pain was developed *via* an iterative process that spanned almost the full duration of the Neck Pain Task Force. The conceptual model, which is described in detail in Guzman *et al*, provided the framework for the formulation of the clinical practice summary statements and recommendations, and includes a classification system for neck pain case definitions.¹

Synthesis of the Evidence

The methodology chosen by the Neck Pain Task Force to summarize scientific evidence was the best evidence synthesis method,¹⁵⁻¹⁷ and is described in full in Carroll *et al*.¹⁸ Briefly, this entailed a comprehensive literature search that located 1203 peer-reviewed articles relevant to the Neck Pain Task Force mandate. After critical scientific scrutiny, the Neck Pain Task Force considered 552 articles admissible as scientific evidence and

included these in the best evidence syntheses on burden and determinants of neck pain,⁶⁻⁸ assessment,¹⁰ treatment,^{2,9} and course and prognosis of neck pain.³⁻⁵ The Neck Pain Task Force also conducted 4 original research projects^{14,19-21} to inform critical aspects of our knowledge about neck pain. These best evidence syntheses and original research studies are the foundation for the present article.

Critical appraisals of the methods and results of admissible studies were integrated to arrive at evidence-based Neck Pain Task Force statements. The statements were structured in a manner compatible with the proposal of the GRADE group and served as an intermediate step in the interpretation of the evidence.¹²

The Neck Pain Task Force aimed for statements that:

- were short, clear and unambiguous
- contained a judgment about the available evidence
- addressed issues (one at a time) relevant to people with neck pain and their clinicians
- were clearly supported by and linked to the evidence

As the analysis advanced, individual evidence-based statements were combined into broader, simpler statements.

Development of Recommendations

As the Neck Pain Task Force advanced in the identification of relevant literature and refinement of the conceptual model, it became evident that there were significant knowledge gaps.²² A method of reconciling the imperfect linkage between the evidence, important questions and clinical scenarios was needed. This allowed recommendations to be directly linked to the evidence as much as possible, although being transparent enough to allow the reader to easily recognize any gaps between the available evidence and the recommendation.

Agreement on recommendations followed 4 steps formulated with the input of the full Neck Pain Task Force (Scientific Secretariat and Advisory Committee).^{11,18} First, small teams of Scientific Secretariat members produced preliminary statements from the summarized literature or primary research; second, preliminary statements were discussed with the Advisory Committee, and revised through an iterative process of the full Scientific Secretariat; third, final statements were combined with elements of the conceptual model and questions relevant to people with neck pain and their clinicians to derive draft recommendations, tables and flowcharts outlining recommended actions; and finally, the recommendations, tables, and flowcharts were discussed and refined until they gained approval of the full Scientific Secretariat.

Some recommendations are presented in the form of “likely helpful” or “likely not helpful”. We believe that these statements indicate a judgment that most well informed people would make. Other statements are presented as acceptable actions or options (“possibly helpful; might consider”)—indicating a judgment that a substantial number of well informed people would make (modified after GRADE).¹² In some areas, the Neck Pain Task Force felt that a recommendation was not warranted given little available evidence and large variation in circumstances. In these situations the Neck Pain Task Force provided simple direct statements of what the evidence says, so that readers can consider the relevance of the evidence to their own context.

■ Results

Concepts

At times neck pain may be inconsequential to the point that the pain is noticed only with prompting; or the individual rapidly forgets having experienced the episode. Other times, neck pain severity or circumstances may prompt people to seek care, reduce activities and/or file a claim to access financial benefits or compensation.¹

Neck pain is a ubiquitous symptom, and only a minority of people with neck pain seek healthcare. Who seeks clinical care is likely determined by multiple factors, including perceived pain severity and speed of onset, presence of trauma at onset, previous personal experience, and cost and availability of care. The care sought and provided depends on the particular patient situation, available resources and the clinicians' background and training.

Common clinical scenarios are care in the emergency room, ambulatory primary care, secondary care, and tertiary care. Each of these settings involves different challenges in the assessment, diagnosis, management, and monitoring progress of the patient with neck pain because of differences in the duration and complexity of the problem. For example, in primary care settings, the emphasis is generally on screening to rule out concerning serious disease or neurologic problems and provide supportive care. In tertiary settings, the challenge is how to assist patients who may have failed multiple previous treatments and present with severe pain and disability.

Findings

The full versions of all the Neck Pain Task Force results and evidence-based statements are presented in separate articles in this supplement. For more details on any of these topics, see the best evidence syntheses from which these summary statements were drawn.²⁻¹⁰ The text box presents a brief summary of those Neck Pain Task Force findings of greater relevance to clinicians deciding on how to best assess and manage patients with neck pain.

The Bone and Joint Decade 200–2010 Task Force on Neck Pain and Its Associated Disorders Recommends That Clinicians Consider the Following When Assessing and Managing a Person With Neck Pain:

Any given clinician only sees a small portion of the whole spectrum of neck pain.

- Neck pain is a very common symptom, experienced in different situations and circumstances. Most people do not seek care and choose the deal with neck pain on their own.
- Decisions to seek care, and the kind of care sought, depend on severity and on personal and local circumstances. These circumstances include such factors as public expectations, and health care policies affecting availability and payment for health care services.

- The clinical and demographic profiles of patients vary by clinical setting (*i.e.*, emergency room, primary, secondary and tertiary care settings); they also vary from country to country, and within regions of the same country.

- The preferred approach to assessment and management will vary according to patient presentation, the background of the clinician, and locally available resources.

- The patients described in research studies also vary greatly, and extrapolating from studies to a given situation of practice should be done with caution.

- The annual incidence of neck pain per 1000 people in the population decreases as the case definition is restricted to more severe or specific neck pain:

- neck pain <1 day during the year = 179 per 1000
- seeking ambulatory healthcare = 15–80 per 1000
- visit to emergency room for neck pain = 0.3–3 per 1000
- cervical disk protrusion with radicular signs = 0.055 per 1000

In most settings a simple descriptive clinical diagnosis might be preferable to a speculative tissue diagnosis as origin of the pain. The Neck Pain Task Force recommends the following clinical classification system for neck pain that prompts the individual to seek or require health care.

- Grade I: No signs of pathology and no or little interference with daily activities. This is frequently the case. Reassurance might be all that is required.
- Grade II: No signs of pathology, but interference with daily activities. This occurs less frequently (<10% of people report having experienced this severity of pain during the previous year). Clinical intervention may be sought to decrease symptoms.
- Grade III: Neck pain with neurological signs or symptoms (radiculopathy). This is uncommon, but may require specific tests and treatments.
- Grade IV: Neck pain with signs of major pathology (*e.g.*, serious instability or spinal infection). Rare, but might require urgent tests and treatments.

Assessment of whiplash-associated disorders and blunt trauma.

- The assessment of patients with blunt trauma to the neck in the emergency room has been well studied and defined.
- Screening protocols such as the Canadian cervical spine rule and the NEXUS low risk criteria are very effective at identifying low-risk patients that do not require imaging.
- In patients at high risk of cervical spine fracture or dislocation, CT scan is more sensitive than x-rays.

- Regular 3-views x-rays are as accurate as flexion-extension x-rays or 5-views x-rays in identifying fractures.
- There is no scientifically admissible evidence to support use of routine MRI as a screening tool.

Assessment of nontraumatic neck pain.

- Specific pathologic diagnoses are not usually needed or corroborated in common non-traumatic neck pain.
- It is important to consider the possibility that serious disease is a cause of neck pain. A detailed evaluation is warranted in patients with “red flag” findings, as is done in low back pain assessment.
- A negative neurological examination indicates a very low likelihood of root compression; however, positive findings suggesting root compression are not highly specific. Provocation tests, in particular contralateral neck rotation and extension of the arm and fingers, are an exception in that they are highly predictive of radiculopathy.
- Pain visual analogue scales, numeric ratings, and self-report disability scales (such as the Neck Disability Index) are reliable, sensitive to change and have prognostic value in describing the impact of neck pain on daily activities.
- Measuring cervical range of motion by external device is not more reliable or informative than clinical exam or patient self-report.
- Palpation by a clinician and self-palpation appear equally reliable and identify the same tender areas around the neck. These have not been shown to establish a specific diagnosis.

Imaging studies often report findings that might have little to do with neck pain.

- There is no evidence that the degree of cervical lordosis or kyphosis can accurately identify “cervical muscle spasm” or distinguish patients with WAD from those without WAD.
- There is no evidence that MRI accurately detects specific trauma-related findings in the cervical spine in the absence of fracture or major ligamentous disruption.
- Degenerative changes observed in MRI are common in asymptomatic subjects and increase with age. These are not well correlated with neck pain.
- The validity of high-intensity signal MRI findings in the upper cervical spine ligaments to identify acute whiplash injury has not been demonstrated.
- There is no evidence that common degenerative changes on cervical MRI are the cause of pain in patients with clinically suspected cervicogenic headache.

Special tests seem to have little proven advantages.

- There is no evidence that any routine blood tests help in the assessment of patients with neck pain in the absence of red flags.
- There is no evidence to support the use of electrodiagnostic testing in patients with neck pain without suspected radiculopathy.
- There is no evidence that pain reproduction on provocative disc injection (discography) identifies the injected disc as the cause of primary serious neck pain problems. There is no evidence that provocative cervical discography improves outcomes in treating patients with neck pain.
- There is no evidence supporting the validity of diagnostic facet joint or medial branch blocks in diagnosing cervical facet joint pain as the primary cause of disabling neck pain: these tests also show poor reliability.
- Manual assessment of joint endplay and low amplitude manipulation did not improve outcomes to manipulation in one short-term randomized trial.

Certain management strategies can help, at least in the short term.

- In the early stages of Grade I or II neck pain (no radiculopathy or structural pathology) after a motor-vehicle collision, the Neck Pain Task Force recommends the following clinical approach:
 - Reassurance about the absence of serious pathology.
 - Education that the development of spinal instability, neurological injury or serious ongoing disability is very unlikely.
 - Promotion of timely return to normal activities of living.
 - If needed, exercise training and/or mobilization can provide short term relief.
- In people with Grade I or II neck pain (no radiculopathy or structural pathology) but no trauma:
 - Anti-inflammatory drugs, muscle relaxants, percutaneous neuromuscular therapy, mobilization, and laser therapy are more effective than placebos.
 - Exercise training, mobilization and acupuncture are more effective in the short term than conventional medical care or “usual care.”
 - There is no evidence to suggest that one medication is superior to another or to non-medication therapies.
- Epidural and transforaminal corticosteroid injections in people with *Grade III* neck pain (neck pain with radiculopathy) can provide short-term relief, but injections and other invasive treatments have unclear benefits in people with neck pain without radiculopathy.

- Surgery has not been proven helpful for common neck pain (Grade I or II), but it is sometimes helpful in people with Grade III neck pain (radiculopathy) or Grade IV neck pain (major structural pathology).
- Early experience with arthroplasty with artificial spinal disks has shown similar results to anterior discectomy and fusion for cervical radiculopathy.

Treatments have uncommon, but sometimes severe side-effects.

- Anti-inflammatory medications often produce dyspepsia, but also increase the chance of gastrointestinal bleeding (up to 2% per year with chronic use) and heart attacks.
- Muscle relaxants and narcotic pain medications produce drowsiness in approximately 1 in 3 patients. This may impair working or driving.
- Exercise might produce transitory increases of pain, but is beneficial in the long-term.
- Manual medicine: manipulation (involving sudden movement or neck adjustment) can produce transitory increase in pain and discomfort in up to 30% of patients. This risk appears less likely with mobilization.
- In persons younger than 45 years, there is an association between *chiropractic* care and vertebrobasilar artery (VBA) stroke; there is a similar association between *family physician* care and VBA stroke. This suggests that there is no increased risk of VBA stroke after chiropractic care, and that these associations are likely due to patients with headache and neck pain from vertebral artery dissection seeking care while in the prodromal stage of a VBA stroke. Unfortunately, there is no practical or proven method to screen patients with neck pain and headache for vertebral artery dissection. However, VBA strokes are extremely rare, especially in younger persons.

- Injections in the neck can produce transient increases in pain, numbness or dizziness in up to 16% of patients, but major complications are rare (less than 1%).
- Surgery often produces transitory hoarseness and difficulty swallowing, and rarely permanent hoarseness, nerve or spinal cord injury, or stroke.

When common nonsurgical neck pain treatments are compared on the basis of the risk of adverse events, there is no treatment that is clearly better for all patients. Since several non-invasive treatments seem roughly equivalent in efficacy and the overall risk of significant side effects is minimal, patient preference should be an important guide in choice of treatment for short-term relief of neck pain.

Tables 1 to 4 report on the epidemiology of neck pain and the factors associated with its onset and prognosis.³⁻⁸ To summarize, the best evidence suggests that neck pain is common. Between 30% and 50% of the adult population (and between 20% and 40% of children and adolescents) reports having experienced neck pain in the previous year (prevalence). Fifteen percent to 20% of those with no initial neck pain will report a *new* episode at some point in the following year (incidence). These figures are slightly higher in the working population, and some types of employment (*e.g.*, computer terminal workers and health care workers) have the highest rates of neck pain. Most of the time, however, neck pain does not interfere with daily activities, and does not result in the individual seeking health care. For the majority of those with neck pain (50%–80%), the course seems to be persistent or recurrent (that is, with remissions and exacerbations) over years and months.³ However, even in the absence of complete recovery, there is often improvement: over one-third of those with severe neck pain (neck pain that is intense or which in-

Table 1. The Risk of Having a New Episode of Neck Pain*

Scenario and Grade of Neck Pain	Chance of a New Episode in the Following Year
General population	
Self-reported neck pain (unspecified severity)†	15%–20%
Seeking health care for neck pain	1.5%–8%
Seeking emergency room health care for neck pain	0.004%–0.3%
Grade III neck pain (pain with radiculopathy or irritation of the nerve root)	0.0055%
Grade IV neck pain (neck pain with major structural pathology)	Unclear, likely <0.01%
At work	
Self-reported neck pain (unspecified severity)†	15%–60%
Neck pain that interferes with daily activities	4%–15%
Compensated neck pain	0.2%–0.4%
After a traffic collision	
Self-reported neck pain (unspecified severity)†	10–14 injury claims for neck pain for each 100 vehicles with collision damage claims
Neck pain that interferes with daily activities	Unknown
Seeking hospital care (1970s–1990s)	0.003% to 0.33%
Filing an injury claim (Canada, in the 1990's)	0.07% to 0.6%

*All numbers are approximate and reflect the interpretation of all admissible scientific evidence by the Neck Pain Task Force.

†“Unspecified severity” refers to findings from studies in which pain severity was not reported or where findings were not stratified by pain severity.

Table 2. Factors that Decrease the Chances of Getting a New Episode of Neck Pain

Scenario and Grade of Neck Pain	Likely Decrease	Might Decrease	No Effect	Not Enough Evidence to Make Determination
General population	No previous neck pain, no other musculoskeletal problems, good psychological health	Younger age, male gender, non-smoking changing rules in sports (like in ice hockey)	Obesity	Weight of school bags, cervical disc changes (on imaging)
At work	Younger age (peak risk in 4th and 5th decades) male gender, no previous pain in the neck, back or upper limbs, little psychological job strain, good coworker support, active work (nonsedentary), less repetitive or precision work	Not being an immigrant or a visible minority, higher strength or endurance of the neck, not working with the neck bend for prolonged periods, non-smoking, no previous headaches, good physical health, "non-type A" personality, not working in awkward positions, light physical work, adequate keyboard position, no awkward head elbow and shoulder posture, no screen glare	Physical or sports activity during leisure, sleep quality, time spent on domestic activities, time spent on hobbies	Marital status, education, occupational class, duration of employment, obesity, self-assessed health status, mental stress, job satisfaction, working with hands above the shoulder level, height of computer screen, cervical disc changes
After a traffic collision	—	Male gender, no previous neck pain, riding in back seat, side collision, no compensation for pain and suffering, specially engineered car seats and headrests	Tow bars in the car, age type of child seat restraint	Awareness of collision, head position at time of collision, severity of collision impact, cervical disc changes (on imaging)

terferes with daily activities) will experience some degree of improvement over the next 6 months to a year. Recovery from whiplash-associated disorders (WAD) seems to be prolonged in approximately 50% of those attending emergency rooms or making an injury claim after a motor vehicle collision (*i.e.*, they report some persistent WAD symptoms 1 or more years after the injury).⁴ However, only 12% of those with WAD reported daily pain at 1 year, and fewer reported symptoms that significantly impacted their health. These figures should be understood within the context of the high prevalence of neck pain in population at large (between 20% and 40% of the general population report having experienced neck pain in the past month; and 8% to 15% reported pain in the past month that interfered with activities).⁷

Table 5 summarizes the best evidence on assessment of neck pain. The scientific evidence regarding clinical assessment was uneven. There were many good studies about emergency room assessment of people with blunt

trauma to the neck, and the use of self-report scales to assess pain and disability in ambulatory care settings. However, there was little scientifically admissible evidence on establishing a structural diagnosis or cause for neck pain and on the best assessment in secondary and tertiary care (Table 5).¹⁰

Tables 6 and 7 summarize the best evidence on non-invasive and invasive interventions, and Table 8 summarizes complications of common treatments. The scientific evidence regarding clinical management was abundant in "nonspecific" neck pain (equivalent to nontraumatic Grade I and Grade II neck pain in the Neck Pain Task Force classification), but more limited with respect to managing persisting pain and disability after WAD. Most of the studies have relatively short follow-up (up to a year) and thus scientific evidence on the best long-term management strategy is sparse (Table 6).^{2,9}

Given the restricted scope of the available evidence, the Neck Pain Task Force's recommendations focus on

Table 3. The Chances of Full Recovery of Neck Pain*

Scenario and Severity of Neck Pain	Chances of Full Recovery 1 Year Later (Prognosis)
General population (may or may not be seeking health care for pain)	
Self-reported pain (unspecified severity)†	15%–50% report "no pain" at 1 yr
Self-reported pain (interferes with activities)	Recovery unknown: 30% improve to some degree
At work (not on compensation)	
Self-reported pain (unspecified severity)†	40%–50% report "no pain" at 1 yr
Self-reported pain (interferes with activities)	Recovery unknown: 50%–60% improve to some degree
After a traffic collision (persons making injury claims, attending ER)	
Self-reported post-injury pain (unspecified severity)†	40%–50% report "no pain or symptoms" at 1 yr
Self-reported post-injury pain (interferes with activities)	Unclear, but probably 5%–15%
Neck pain with healthcare, consulted physician, grade I or II (no radiculopathy or structural pathology)	30%

*All numbers are approximate and reflect the interpretation of all the admissible scientific evidence by the Neck Pain Task Force.

†"Unspecified severity" refers to findings from studies in which pain severity was not reported or where findings were not stratified by pain severity.

Table 4. Factors that Increase Chances of Recovery From an Episode of Neck Pain

Scenario and Grade of Neck Pain	Likely Increase	Might Increase	No Effect	Not Enough Evidence to Make Determination
General population	Younger age, no previous neck pain, good physical and psychological health, good coping, good social support	Being employed	—	Gender, general exercise or fitness prior to pain episode, cervical disc changes
At work	Exercise and sports, no prior pain or prior sick leave	Changing jobs (for certain job types), white collar job, greater influence over work	Age, ergonomics/physical job demands, work-related psychosocial factors (but many such factors not studied)	Gender, compensation, litigation, obesity, smoking, cervical disc changes
After a traffic collision	No prior pain or sick leave, fewer initial symptoms, less symptom severity, Grade I WAD, good psychological health (e.g., not coping passively, no fear of movement, no postinjury anxiety), no early "overtreatment"	No prior pain problems, good prior health, non-tort insurance, no lawyer involvement, lower collision speed	Collision specific factors (such as head position when struck, position in vehicle, direction of collision)	Age, gender, culture, prior physical fitness, cervical disc changes

primary care in the emergency room and in ambulatory primary care settings.

Recommendations

The Neck Pain Task Force proposes that the initial clinical assessment of patients with neck pain should classify patients into 4 broad categories or grades (described later) rather than on establishing a specific structural diagnosis. Each "grade" of neck pain requires different investigations and management. In addition, different setting requires different assessment and management strategies: Assessment and management of persons presenting to the emergency room after a blunt trauma are described in Figure 1; assessment and management of those in primary care out-patient settings are described in Figure 2.

Grade I: Neck Pain With No Signs of Serious Pathology and No or Little Interference With Daily Activities. In this grade of neck pain, complaints of neck pain may be associated

with stiffness or tenderness but no significant neurologic complaints. There are no symptoms or signs to seriously suggest major structural pathology, such as vertebral fracture, dislocation, injury to the spinal cord or nerves, infection, neoplasm, or systemic disease including the inflammatory arthropathies.

Grade II: Neck Pain With No Signs of Serious Pathology, but Interference With Daily Activities. In this grade of neck pain, complaints of neck pain are associated with interference in daily activities, but no signs or symptoms to seriously suggest major structural pathology or significant nerve root compression. Interference with daily activities can be ascertained by self-report questionnaires.

Grade III: Neck Pain With Neurologic Signs of Nerve Compression. In this grade of neck pain, complaints of neck pain are associated with significant neurologic signs such as decreased deep tendon reflexes, weakness, and/or

Table 5. Assessments and Tests That Help

Scenario and Grade of Pain	Likely Helpful (Worth Considering)	Possibly Helpful (Might Consider)	Likely Not Helpful (Not Worth Considering)	Not Enough Evidence to Make Determination
Emergency room, initial assessment after blunt trauma to the neck	Canadian C-spine; NEXUS criteria	—	—	—
Emergency room, in those at high risk of fracture	CT-scan; standard 3-view x-ray	—	Flexion-extension x-rays, five-view x-rays, blood work	MRI
Primary ambulatory care, initial assessment, no trauma	Self-assessment questionnaires; clinical examination	—	—	Patient history*, inspection for range of motion, palpation to document tender areas
Ambulatory care, grade I or grade II neck pain	—	—	x-ray CT Scan MRI, discography	—
Grade III	Provocative tests to rule in grade III	Physical exam to rule out grade III, MRI	—	EMG*
Grade IV not reviewed by Task Force	—	—	—	—

*No admissible scientific studies found, but the Neck Pain Task Force considered that evidence on low back pain is applicable to neck pain and provides recommendations on history and EMG.¹⁰ MRI indicates magnetic resonance imaging; EMG, electromyography.

Table 6. Noninvasive Interventions that Help Persons With Neck Pain and Associated Disorders in the Short-term

Scenario and Grade of Pain	Likely Helpful (Worth Considering)	Possibly Helpful (Might Consider)	Likely not Helpful (Not Worth Considering)	Not Enough Evidence to Make Determination
After a car collision, Grade I and II neck pain, (Acute)	Educational video, mobilization, exercises, mobilization plus exercises	Pulsed electromagnetic therapy	Pamphlet/neck booklet alone, collars, passive modalities (heat, cold, diathermy, hydrotherapy), referral to fitness or rehab program, frequent early health-care use, methylprednisolone	Manipulation, traction, NSAIDS, other drugs
After a car collision, Grade I and II neck pain (nonacute)	—	Supervised exercises, coordinated multidisciplinary care	Passive modalities (TENS, ultrasound), corticosteroid injections	Manipulation, traction, NSAIDS, other drugs
Nontraumatic neck pain, grade I and II	Manipulation, mobilization, supervised exercises, manual therapy (manipulation, mobilization, massage) plus exercises, acupuncture, low-level laser therapy, analgesics	Percutaneous neuromuscular therapy, brief intervention using cognitive behavioral principles	Advice alone, collars, passive modalities (heat therapy, ultrasound, TENS, electrical muscle stimulation), exercise instruction, botulinum toxin A	Magnetic stimulation, massage alone, traction, NSAIDS, other drugs
Grade III neck pain (suspected cervical radiculopathy)	—	—	—	All interventions
Cervicogenic headache	—	Manipulation, mobilization, supervised exercises, manipulation or mobilization plus supervised exercises, water pillow	—	Passive modalities, traction, NSAIDS, other drugs
At work, interferes with daily activities	—	Supervised exercises plus strength or endurance training and/or relaxation training with behavioral support	Ergonomic interventions, forced work breaks, rehabilitation programs, stress management programs, relaxation training, physical training, exercise instruction	—

Table 7. Invasive Interventions That Could Help Persons With Neck Pain and Associated Disorders

Scenario and Grade of Pain	Likely Helpful (Worth Considering)	Possibly Helpful (Might Consider)	Likely not Helpful (Not Worth Considering)	Not Enough Evidence to Make Determination
Grade IV Neck Pain (neck pain with major structural pathology)	Beyond the NPTF mandate. Aggressive surgical treatment of many of these conditions is generally accepted as effective and often strongly advised. Readers are referred to literature of specific pathological conditions			
Grade III Neck pain (neck pain with radiculopathy)	Discectomy or discectomy with fusion	Trial of corticosteroid injections (<4) for short term relief Discectomy with fusion and instrumentation. Cervical disc replacement (unknown long term efficacy and safety)	Heating of the dorsal Root ganglion	
Grade I or Grade II neck pain	None	None	Corticosteroid injections to cervical facets	RF Neurotomy to cervical facets nerves. Cervical decompression. Anterior cervical fusion (any method). Cervical disc replacement
Grade I or II neck pain after car collisions	None	None	Corticosteroid injections to cervical facets	RF Neurotomy to cervical facets nerves. Cervical decompression. Anterior cervical fusion (any method). Cervical disc replacement
Cervicogenic headache without serious underlying structural pathology	None	None	None	RF neurotomy to cervical facets nerves. Corticosteroid injections to cervical facets or nerves. Cervical decompression. Anterior cervical fusion (any method). Cervical disc replacement

Table 8. Complications From Interventions*

Intervention	Common	Occasional	Rare	Remote	Not Enough Evidence to Make Determination
NSAIDs	Dyspepsia	GI bleeding	Heart attacks	—	—
Muscle relaxants	Drowsiness	—	—	—	—
Exercise	Transient discomfort, dizziness	—	—	—	—
Mobilization	—	Minor, transient discomfort	—	—	—
Manipulation	Minor, transient discomfort	—	—	VBA stroke	—
Epidural injections	—	Increased pain; headache	Dural puncture	—	Major neurologic injury; Infection
Cervical root injections	Pain at injection; Increased radicular pain; lightheadedness	Increase neck pain; Headache; Nausea	Transient weakness	—	Major neurologic injury; Infection
RF facet ablation	Transient increased pain (2 wk); Permanent numb patch to neck	—	—	—	Poorly documented
Surgery—discectomy with or without fusion	Nonunion; Any serious complication (>75 yr old); Dysphagia; Hoarseness (vocal cord dysfunction, any degree); Serious early complication with the use of BMP	Vocal cord paralysis (symptomatic); Donor site pain (persistent)	Permanent symptomatic vocal cord dysfunction; Root or cord injury; Vertebral artery injury	Other medical, anesthetic and surgical complications as for any surgery	Major neurologic injury; Infection

*Common: >10%, occasional: between 1% and 10%, rare: between 0.001% and 1%, remote: <0.001%.
GI indicates gastrointestinal; VBA, vertebral-basilar artery; BMP, bone morphogenic protein.

sensory deficits. These suggest malfunction of spinal nerves or the spinal cord. The mere presence of pain or numbness in the upper limb without definitive neurologic findings and consistent imaging studies does not warrant a grade III neck pain designation.

Grade IV: Neck Pain With Signs of Major Structural Pathology.

This grade of neck pain includes complaints of neck pain and/or its associated disorders where the examining clinician detects signs or symptoms suggestive of major structural pathology.

The most important differentiation for the clinician confronted by a patient with neck pain is the differentiation of grade IV neck pain from the other categories. This requires the ability to be aware of the red flags for fractures, myelopathy, infection, neoplasm, and other destructive lesions, and systemic diseases such as the inflammatory arthropathies. These conditions make up a very small percentage of people who experience neck pain and the subsequent diagnosis and treatment of these disorders are not addressed by the Neck Pain Task Force recommendations.

Clinical Approach to Blunt Trauma to the Neck in the Emergency Room. Based on the admissible scientific evidence reviewed, the Neck Pain Task Force recommends the clinical management of patients with neck pain presenting to the emergency room after motor vehicle collisions, falls and other mishaps involving blunt trauma to the neck should include the following (Figure 1).

- Patients with suspected blunt trauma to the neck presenting to the emergency room with decreased level of consciousness, intoxication, and/or major dis-

tracting injuries should be considered high risk for cervical spine fracture or dislocation.²³ A CT scan of the cervical spine should be considered if available.

- Alert (Glasgow Coma Scale of 15) and stable patients should be screened according to the NEXUS criteria or the Canadian C-spine rule.^{23,24}
- Patients screened as low risk with the above (*i.e.*, grade I and grade II neck pain in our proposed classification system) do not require radiologic investigation and should receive reassurance and supportive care. An educational video might decrease the risk of persistent disabling pain. Advice for this low-risk group should include reassurance that serious injury has been appropriately excluded, and encouragement to remain as active as possible without immobilization of the neck (see Table 6 and Hurwitz *et al.*).^{9,10}
- Patients who do not meet the low-risk criteria (NEXUS, C-Spine rule)^{23,24} should receive a plain, 3-views radiograph or a CT of the cervical spine. If suspicion remains about cervical spine fracture or dislocation after plain radiography, this group should receive a CT-scan.
- In the absence of radicular pain or neurologic signs, and where radiographs and/or a CT-scan rule out spinal fracture or dislocation, patients should be classified as grade I or grade II (as appropriate). As for the low-risk group above, management may include an educational video, reassurance and encouragement to remain active.
- Patients with radiographs or CT-scan compatible with spinal fracture or dislocation and those with radicular findings (decreased deep tendon reflexes,

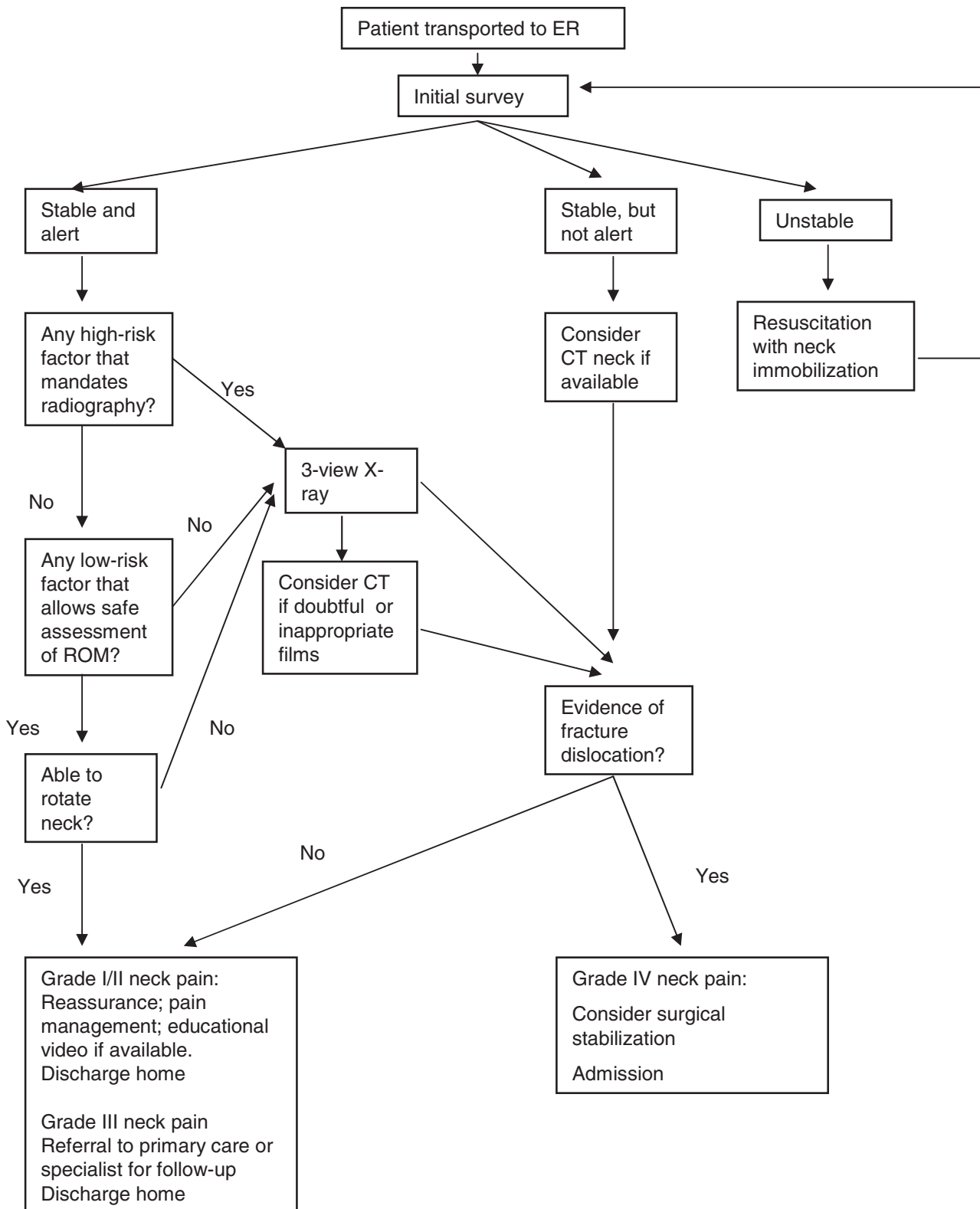


Figure 1. Assessment and management of blunt trauma to the neck in the emergency room as proposed by the Bone and Joint Decade 2000–2010 Task Force on Neck Pain and Its Associated Disorders. High risk factors that mandate radiography include age ≥ 65 or dangerous mechanism or paresthesias in extremities. A dangerous mechanism is considered to be a fall from an elevation ≥ 3 ft or 5 stairs; an axial loading to the head (e.g. diving); a motor vehicle collision at high speed (>100 km/hr) or with rollover or ejection; a collision involving a motorized recreational vehicle; or a bicycle collision. Low risk factors that allow safe assessment of range of motion include: simple rear end motor vehicle collision or sitting in the emergency department or ambulatory at any time or delayed (not immediate) onset of neck pain or absence of midline cervical tenderness. A simple rear-end motor vehicle collision excludes being pushed into incoming traffic, being hit by a bus or a large truck, a rollover, and being hit by a high-speed vehicle.²⁴

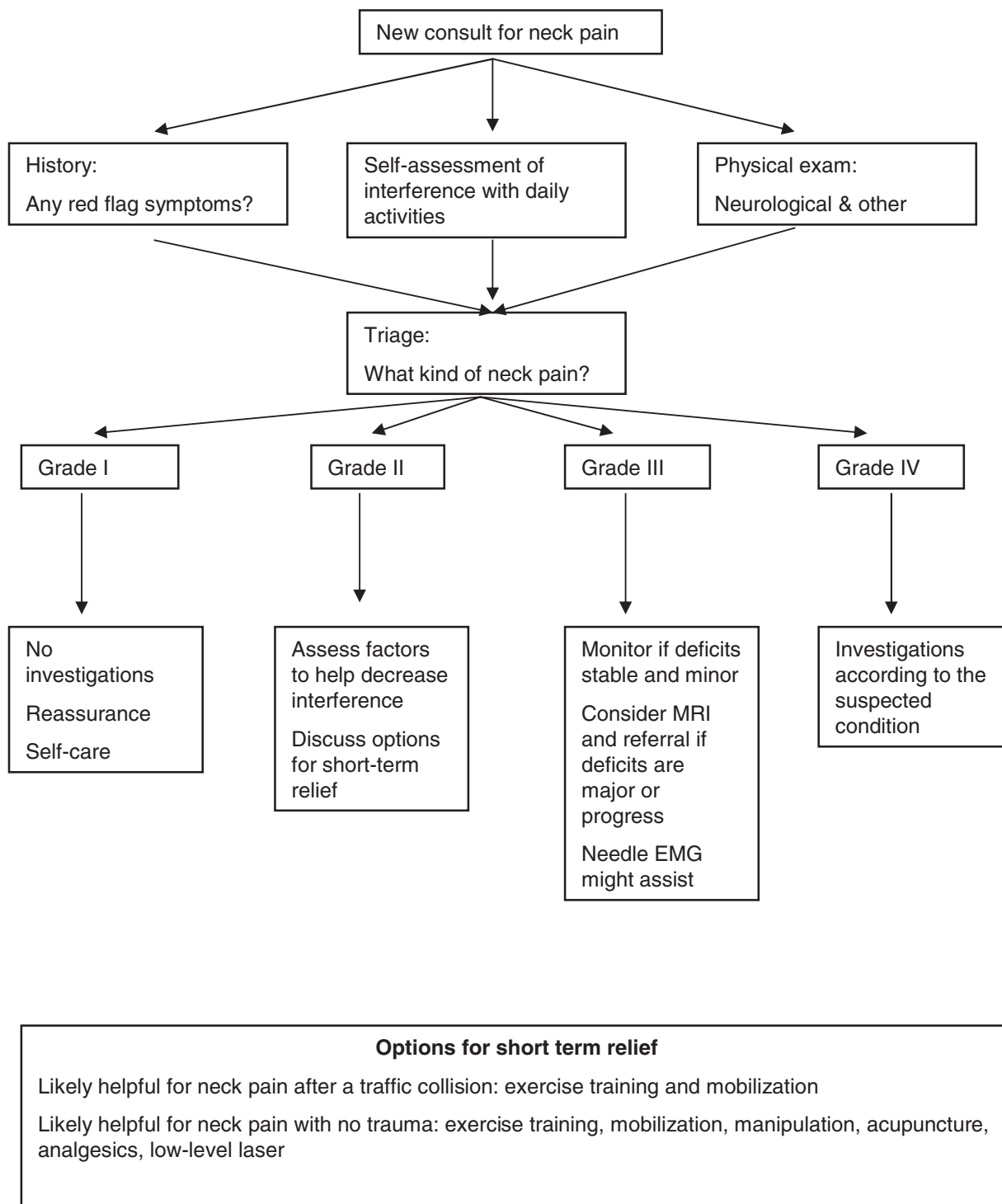


Figure 2. Assessment and management of neck pain in primary care settings as proposed by the Bone and Joint Decade 2000–2010 Task Force on Neck Pain and Its Associated Disorders. MRI, magnetic resonance imaging of the cervical spine; EMG, electromyography, Mobilization, manual medicine technique in which the neck is moved at low speed without trust. Manipulation, manual medicine technique in which a high-speed thrust is applied to the neck.

weakness and/or sensory deficits) should be referred to a spinal surgery specialist for evaluation.

- Flexion-extension radiographs, 5-views radiographs, and MRI of the cervical spine do not add meaningful clinical information to the emergency management of blunt trauma to the neck in the absence of fracture, dislocation, or radicular signs.¹⁰

Clinical Approach to Neck Pain in Primary Ambulatory Care.

Based on the admissible scientific evidence reviewed, the Neck Pain Task Force recommends the clinical management of patients presenting to primary ambulatory care should include the following (Figure 2). Patients attending ambulatory care with a new episode or exacerbation of neck pain and associated disorders should undergo a

screening history and physical examination to triage them into 1 of 4 grades of neck pain (as described previously). The screening history and physical examination should include the following:

- Questions similar to those used to identify red flags in low back pain to rule out grade IV neck pain (trauma, osteoporosis risk, myelopathy, history of cancer, unexplained weight loss, fever, infections; see Nordin *et al*).¹⁰
- Questions or formal self-report questionnaires to assess severity of pain (*e.g.*, visual analogue scale or numerical pain rating) and degree of interference with daily activities (*e.g.*, Neck Disability Index).²⁵ Major interference with daily activities merits a grade II classification.
- Inspection for muscle wasting, swelling, redness, scars, nodules, and ganglions.
- Range of motion of the neck to document baseline status. This may help in monitoring progress but has no use in classification of neck pain.
- Palpation for tenderness to document baseline status. This has only fair to moderate reliability and has no use in classification of neck pain.
- Neurologic examination for reflexes, muscle strength, and sensory deficits (increased or decreased sensation in dermatome distribution), to evaluate possible radiculopathy (grade III).
- Provocation tests, in particular contra lateral rotation of the head and extension of the arm and fingers. If positive this strongly suggests radiculopathy (grade III).¹⁰

Those patients categorized as grade I in the initial assessment:

- Do not require further imaging or laboratory investigation.
- Should be reassured that serious structural injury is very unlikely. These patients can be appropriately managed with self-care (continuation of activities, simple stretches, and over-the-counter analgesics if needed).
- Patients should be encouraged to remain as active as possible and avoid immobilization of the neck.
- If desired by the patient, short courses of treatments may be undertaken (see Table 6 for treatments with demonstrated effectiveness); however, none of these therapies are likely to have a large clinical effect, and should only be undertaken after discussing expected short-term benefits and possible side-effects. Given the similarity across these treatments in risks and benefits, patient preference should be an important consideration in choice of treatment modality.

Those patients categorized as grade II in the initial assessment:

- Do not require further imaging or laboratory investigation.

- Should be reassured that serious structural injury is very unlikely.
- Should be assessed for environmental and personal factors interfering with functioning and supported in addressing these factors.
- Might consider short-term management of symptoms with an intervention with demonstrated efficacy (Table 6). Although effective, these measures are unlikely to have a large clinical effect, and, as above, patients should be informed of likely benefits and risks before initiating treatment. Patient preference should be an important consideration in choice of treatment modality.
- Should be reassessed as needed.

Those patients suspected as grade III in the initial assessment:

- Require closer monitoring to detect any progression of neurologic signs, and should be followed up by primary care clinicians or a specialist.
- Those with severe incapacitating radicular pain, major neurologic deficits at onset, or progression of deficits should be considered for CT or MRI imaging and referral for a specialty opinion. Needle EMG may be of value in confirming the presence of radiculopathy.
- Might require short-term management of symptoms; but there is little evidence for or against specific therapies, other than perhaps a short trial of transforaminal steroids for short-term relief.

Those patients suspected as grade IV in the initial assessment:

- Should undergo expedient investigation tailored to the suspected condition.
- No single test will be indicated in all circumstances, but radiographs, MRI, bone-scan, and inflammatory markers in blood might be considered.
- If testing rules out major pathology, patient should be reclassified as grade I, II, or III (as appropriate) and managed accordingly.
- If initial testing does not rule out major pathology, referral might be indicated.

■ Discussion

The key concepts, findings, and recommendations described in this article are the result of over 6 years of literature review, research, and discussion by a 12-member multidisciplinary Scientific Secretariat of the Bone and Joint Decade 2000–2010 Task Force on Neck Pain and Its Associated Disorders, supported by a 17-member international and multidisciplinary Advisory Committee.¹¹ The detailed results and findings are reported in multiple articles in this supplement.^{2–11}

Key points for clinicians to consider are as follows. Clinicians caring for people with neck pain see only a small portion of the whole spectrum of neck pain in the popula-

tion. In most primary care settings, a simple descriptive diagnosis is enough to provide appropriate care. Protocols for the assessment of blunt trauma to the neck in the emergency room are well established. Although imaging studies often report common degenerative findings, this condition may have little to do with the pain. Most special tests have little or no proven usefulness, unless radiculopathy or serious structural disease are strongly suspected. Studies of interventions for grades I or II neck pain provide evidence of some short-term benefits of exercise, mobilization, manipulation, acupuncture, analgesics, and low-level laser, each of which has its own profile of occasional to common mild side-effects, and rare severe side-effects.

Based on the reviewed evidence the Neck Pain Task Force recommends that patients with suspected blunt trauma to the neck should be screened according to the Canadian C-spine Rule or NEXUS criteria^{23,24} to separate them into low and high risk for cervical spine fracture/dislocation and subsequently managed as outlined in Figure 1. We also recommend that patients attending primary ambulatory care because of neck pain and its associated disorders, should be triaged by history, self-report questionnaires, and physical examination into 4 grades and managed as outlined in Figure 2.

Strengths and Limitations

The Neck Pain Task Force approached the development of guidance for patients and clinicians from the stand-point of best evidence synthesis:^{15,16} the best guidance is based on solid scientific evidence that has been properly appraised, debated, and interpreted. The Neck pain Task Force explicitly avoided using a review process that relied exclusively on the design and number of studies to assign strength of evidence or strength of recommendations. Instead it relied on intensive, iterative debates on the strengths and weaknesses of scientifically admissible studies by a multidisciplinary team of methodologists and clinicians supported by an international advisory committee (see Carroll *et al*¹⁸ for details about methodology).

Rather than grading the strength of a recommendation as is sometimes done, the Neck pain Task Force provided a recommendation only when it seemed clear after critical examination of the evidence that most well-informed people would chose a particular option. Otherwise, we listed options the evidence suggested would be chosen by a substantial number of well-informed people. This is a conservative approach and as a result, in many areas, no specific recommendations are provided. On those topics, the Neck Pain Task Force provided a succinct summary of what the best evidence says for patients and clinicians to consider in making their judgment (see text box in this article and the respective articles in this supplement for details).

During the entire process, the Neck Pain Task Force had absolute editorial independence from any professional organization or funding or sponsor institution. In

addition, to enhance transparency, the Neck Pain Task Force undertook a self-study of the individual values, beliefs, and conflicts of interest which might influence — or be seen to influence — the scientific process and conclusions of this endeavor. This self-study was lead by an independent observer, and is reported elsewhere (see Reardon *et al*²⁶).

However, the information, recommendations and conclusions offered by the Neck Pain task Force are only as good as the evidence they are based on. The available evidence has many gaps, and is far from perfect in many respects (see Carroll *et al*²²). As research continues and our knowledge progresses, we expect that some of the recommendations and conclusions will change and evolve. As a consequence, we recommend that further overall or focused reviews be undertaken periodically.

Shifting Thinking About Neck Pain and Associated Disorders

We believe that many of our findings run counter to widely held beliefs. For example, our best evidence syntheses suggest that:

- Neck pain is a widely experienced phenomenon. However, in any given year, less than one quarter of persons in the general population who report a new episode of neck pain will seek conventional medical care for that pain. It would seem that many people who experience neck pain consider it a “fact of life,” rather than a disease or injury that needs to be diagnosed and fixed.⁷
- Neck pain and associated disability are multifactorial, and seldom caused by a single event or factor.^{6–8}
- Common degenerative changes in the cervical spine seen in radiographs or scans are most often unrelated to neck pain.¹⁰
- Many interventions believed to prevent neck pain, such as redesign of cars and office ergonomic interventions, have in fact not been proven to do so.^{6,8}
- A syndromatic diagnosis is enough to manage most neck pain, rather than hunting for a specific tissue pathology, which can be counter-productive.^{9,10}
- Neck pain and associated disorders severe enough to restrict daily activities, seek care or file a claim, tend to persist or recur for many people; rather than the common assertion that soft tissue injuries heal fully within a few months.^{3–5}
- A number of alternative and complementary medicine interventions have more evidence of efficacy than conventional medical care.⁹
- Contrary to popular beliefs, major complications of common treatments are exceedingly rare and probably equivalent on average across treatments.¹⁴
- Often “less is more” when dealing with neck pain treatments, and multiple visits and treatments may make neck pain and disability worse rather than better.⁹

The Neck Pain Task Force believes the examples above, taken together with other findings and recommenda-

tions, signal that a shift in our thinking about neck pain and associated disorders is needed. This is a shift from neck pain being considered a sign of a disease or injury that needs to be diagnosed and treated by experts, to a common occurrence in life where people have options and can often manage on their own.

The Neck Pain Task Force looks forward to scientific debate generated by the release of these findings and recommendations which mark the culmination of 6 years of work. It firmly believes that such debate based on the evidence can open new venues to reduce the personal and societal burden of neck pain and its associated disorders.

■ Key Points

- The Neck Pain Task Force recommends that people seeking primary care for neck pain should be triaged into 4 groups: Grade I neck pain with no signs of pathology and no or little interference with daily activities; Grade II neck pain with no signs of pathology, but interference with daily activities; Grade III neck pain with neurologic signs of nerve compression; Grade IV neck pain with signs of major pathology.
- Diagnostic testing is not indicated in the initial assessment of grade I or grade II neck pain. People with suspected grade III neck pain might require elective investigation. People with suspected grade IV neck pain require immediate investigation.
- In the emergency room after blunt trauma to the neck, triage should be based on the NEXUS criteria or the Canadian C-spine rule. Those with a high risk of fracture should be further investigated with plain radiographs and/or CT-scan.
- In ambulatory primary care, triage should be based on history and physical examination alone, including screening for red flags and neurologic examination for signs of radiculopathy.
- Exercises and mobilization have been shown to provide some degree of short-term relief of grade I or grade II neck pain after a motor vehicle collision.
- Exercises, mobilization, manipulation, analgesics, acupuncture, and low-level laser have been shown to provide some degree of short-term relief of grade I or grade II neck pain without trauma.
- Those with confirmed grade III and severe persistent radicular symptoms might benefit from corticosteroid injections or surgery. Those with confirmed grade IV neck pain require management specific to the diagnosed pathology.

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