Manual Therapy for Neck Pain: Interpretation of Best Practice Guidelines (Post-print)

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Abstract

Neck pain in clinical settings is commonly caused by cervical degenerative diseases, which can adversely affect patients' cervical function and quality of life. To provide optimal and effective diagnostic and treatment protocols, the National University of Health Sciences published an evidence-based clinical practice guideline for neck pain in 2019. Based on a comprehensive review of the diagnostic and therapeutic content of the latest guideline, the author interprets it from three perspectives: diagnosis, treatment, and considerations, while simultaneously retrieving relevant literature to conduct comparative analyses of multiple high-quality neck pain-related guidelines. The scientific basis of manual therapy is analyzed from biomechanical and neurobiological perspectives, and combined with an analysis of the current state of diagnosis and treatment in China, it is concluded that the recommended manual therapy and diagnostic-treatment protocols are feasible within the Chinese context. Based on this, research recommendations are proposed, with the hope of providing references for contemporary domestic clinical practice.

Full Text

Chiropractic Management of Patients with Neck Pain: Interpretation of Best Practice Guidelines

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Abstract

Neck pain, commonly caused by cervical degenerative diseases, adversely affects patients' neck function and quality of life. To provide optimal and effective diagnostic and treatment protocols, the National University of Health Sciences published evidence-based clinical practice guidelines for neck pain in 2019. Based on a comprehensive review of the latest guideline recommendations, this article interprets the guidelines from three perspectives: diagnosis, treatment, and precautions. Concurrently, we conducted a literature review to longitudinally compare multiple high-quality neck pain guidelines, analyzing the scientific basis of manual therapy from biomechanical and neurobiological perspectives. Combined with an analysis of current diagnostic and treatment practices in China, we conclude that the recommended manual therapies and clinical workflows are feasible in the Chinese context. We propose research recommendations accordingly, hoping to inform domestic clinical practice and promote standardized, effective, and safe manual therapy for neck pain. The diagnostic and treatment workflow is illustrated in [Figure 1: see original paper].

Keywords: Neck pain; Manual therapy; Guideline interpretation; Diagnosis; Treatment; Practice recommendations

Introduction

Neck pain (NP) represents a common condition worldwide and constitutes a major cause of disability [1]. Its etiology includes traumatic injuries ("whiplash," cervical fractures), tumors, inflammation, infection, vascular disease, endocrine disorders (Paget' s disease, osteoporotic fractures), and neurological conditions [2]. According to the 2019 Global Burden of Disease Study, low back pain and neck pain have become leading contributors to the global disease burden over the past two decades [3]. Recent research published in *The BMJ* analyzing the global burden of neck and shoulder pain revealed that the number of affected individuals increased by 124.4 million between 1990 and 2017 [4]. Neck pain produces adverse effects as the disease progresses, including neck stiffness, insomnia,

and even cognitive impairment. Studies indicate that the annual prevalence of NP exceeds 30%. Although most acute episodes resolve spontaneously, nearly 50% of patients experience persistent or recurrent NP that limits functional activity [5].

Manual therapy is a commonly employed treatment modality both domestically and internationally. While several NP guidelines mention the potential efficacy of manual therapy, none provide specific recommendations [6-7], creating significant barriers to clinical implementation. The National University of Health Sciences recently published *Best-Practice Recommendations for Chiropractic Management of Patients With Neck Pain* [8] (hereinafter referred to as "the Guideline"), which systematically addresses manual therapy for NP from a comprehensive perspective. This article provides an in-depth interpretation of NP management based on thorough review of the Guideline, aiming to assist clinicians in achieving standardized, effective, and safe manual therapy practice. The recommended diagnostic and treatment workflow is presented in [Figure 1: see original paper].

1.1 History

A thorough history is paramount in disease diagnosis. The Guideline emphasizes that essential historical elements include: (1) assessment for contraindications and risk factors; (2) onset/injury mechanism of NP; (3) pain severity; (4) aggravating and relieving factors; (5) trauma history, previous treatments, and their efficacy; (6) examination findings; (7) surgical history; (8) current medications; and (9) social/family history.

Given the complexity of the condition, clinicians must also evaluate additional factors: (1) systems review and response to prior treatments; (2) past medical history and occupational history; (3) sleep quality and positioning; (4) unhealthy lifestyle habits such as smoking, diet, exercise, substance abuse, alcohol consumption, and prolonged electronic device use; and (5) psychological health issues including stress or depression.

1.2 Symptoms

The Guideline notes that NP patients present with diverse clinical manifestations. Some experience only headache and localized neck pain, while others exhibit additional symptoms such as thoracic spine pain, cervical nerve root irritation or compression symptoms, limb weakness, and sensory abnormalities. In clinical practice, these symptoms require detailed characterization, including precise location, quality, frequency, and duration of pain—such as dull versus sharp pain, pain at rest versus with movement, presence of neurological deficits, and whether accompanied by upper extremity pain, weakness, or sensory disturbances. Furthermore, clinicians must identify factors that aggravate or alleviate symptoms during diagnosis.

1.3 Physical Examination

Physical examination is essential for diagnosing orthopedic conditions. The assessment should include general patient information (age, height, weight) and careful evaluation of local findings, including active and passive cervical range of motion; palpation findings (tissue tension, spasm, tenderness, and trigger points); and special tests (limb muscle strength, Spurling' s test, Valsalva test, neurodynamic testing, cervical traction, and cervical flexion-rotation test).

For patients with confirmed or suspected concussion history, whiplash injury, or potential vertebral artery injury, clinicians must additionally assess orientation and general cognitive function, perform cranial nerve and cerebellar testing, and evaluate memory storage and other brain functions before treatment.

1.4 Imaging

Imaging can detect abnormalities in asymptomatic NP patients, facilitate comprehensive diagnosis, assist in surgical planning, and exclude contraindications and risk factors, thereby improving clinical treatment accuracy. The Guideline states that for acute cervical spine injuries with suspected spinal cord injury, severe ligamentous disruption, or other dangerous conditions, CT and MRI (non-contrast) are the preferred imaging modalities. For chronic NP, the Guideline recommends initial cervical anteroposterior and lateral plain radiographs for three specific scenarios: (1) chronic NP with trauma history; (2) history of malignant tumors; and (3) previous cervical spine surgery. Finally, since patients with spinal degeneration often lack obvious clinical symptoms, imaging solely to identify degenerative changes is not recommended, and no evidence supports the utility of imaging follow-up for NP.

The Guideline notes that most patients with acute NP experience significant symptom improvement within two months; however, approximately half continue to have persistent or frequent symptoms within the first year. About 20% of patients with neck pain and mobility limitations require six months of treatment to achieve improvement. NP treatment should be stratified by disease duration: acute phase (<6 weeks), subacute phase (6 weeks to 3 months), and chronic phase (>3 months). Longer duration and more severe symptoms correlate with poorer prognosis, though treatment principles remain broadly similar across stages. The Guideline emphasizes that treatment planning must consider additional factors such as neurological dysfunction, but conservative therapies including manual therapy may be employed in the absence of progressive neurological deficits.

2.1 Acute and Subacute NP (0-3 Months Duration)

Treatment Protocol: The Guideline recommends multimodal, multi-protocol combined therapy incorporating manual therapy, health education, and func-

tional exercise throughout the entire treatment course from hospitalization to discharge. Patients should be educated about the natural history of NP, taught self-exercise methods, and encouraged to avoid excessive dependence on clinicians while resuming normal functional activities as early as possible. Additional modalities may include low-level laser therapy, transcutaneous electrical nerve stimulation, cervical traction, or electrotherapy, selected based on disease course, pain severity, and comorbidities. Regular assessment of symptom improvement is required to determine whether these adjunctive therapies should be continued.

Manual Therapy Dosage: While the optimal treatment duration for NP remains undefined, the Guideline recommends initial treatment for cervicogenic headache at three sessions per week. For NP-related conditions, a multimodal approach of three sessions per week for four weeks is recommended. Treatment frequency may be appropriately reduced for patients in the acute phase.

2.2 Chronic NP

Clinical management of chronic NP follows similar principles as acute NP, with individualized multimodal treatment recommended. The chronic NP treatment protocol includes: manual therapy (thrust techniques, relaxation techniques, muscle/soft tissue techniques, joint mobilization, traction), acupuncture, home exercises (cervical traction, neck muscle strengthening and mobility exercises), postural advice (encouraging neck and daily activities), stress management, intermittent traction (particularly for patients with neck pain or radicular pain), high-intensity massage (one hour per session, three times weekly for four weeks), and strength training (three times weekly for 20 minutes per session).

Additional modalities for chronic NP may include transcutaneous electrical stimulation, low-level laser therapy, ultrasound, and electrothermal stimulation.

2.3 Precautions

The Guideline highlights risks associated with spinal manual therapy, including potential vertebral artery dissection and stroke, particularly among less experienced practitioners.

2.4 Prognosis

The Guideline identifies "yellow flags" —psychosocial factors including pain-related anxiety, negative treatment attitudes, excessive work stress, lack of social support, and financial concerns—as predictors of poor prognosis that affect treatment adherence, recovery speed, and healing outcomes.

Discussion

Neck pain represents a leading global cause of disability. Following an NP episode, nearly 50% of patients continue to experience persistent or recurrent pain, creating substantial physical, psychological, and economic burdens for both individuals and society. However, research on NP treatment remains relatively limited. Current clinical management primarily involves pharmacological and non-pharmacological approaches, with common non-pharmacological interventions including exercise therapy, manual therapy, traditional Chinese medicine techniques, physical modalities, and orthotic application.

Manual therapy is widely used clinically, with scholars both domestically and internationally employing chiropractic manipulation and traditional Chinese tuina reduction techniques in NP practice. The efficacy of manual therapy for NP has been established [9], with related research incorporated into the American Physical Therapy Association' s 2017 updated guideline *Neck Pain: Revision 2017*. Studies suggest that compared to non-steroidal anti-inflammatory drugs with associated risks, incorporating low-level laser therapy, acupuncture, and manual therapy combined with exercise into chronic NP treatment plans offers greater safety [10]. In 2018, the Editorial Board of *Chinese Journal of Surgery* published *Expert Consensus on Classification, Diagnosis, and Non-surgical Treatment of Cervical Spondylosis* [11], based on symposium discussions combined with domestic and international research and clinical practice. This consensus formed expert recommendations that non-surgical therapy should be the first-line treatment for cervical spondylosis, explicitly recommending traditional Chinese manual therapy for cervical, radicular, and other types of cervical spondylosis, while cautioning against rotational techniques to prevent spinal cord injury.

Biomechanical Mechanisms: Chen et al. [12] investigated American chiropractic treatment for cervical radiculopathy, demonstrating that spinal manipulation can alter spinal biomechanical structures, correct vertebral positioning, and increase intervertebral foramen area, offering a simple, convenient, safe, and effective approach suitable for clinical promotion. Cao et al. [13] developed the "Three-Dimensional Balanced Manipulation" (TBM) technique based on traditional rotational manipulation, investigating its clinical efficacy for cervical radiculopathy through finite element analysis and randomized controlled trials. Finite element modeling demonstrated that TBM can improve vertebral and disc displacement, increase intervertebral space, expand the intervertebral foramen, and relieve mechanical compression of the superior and inferior articular processes, thereby alleviating nerve root compression and irritation.

Neurobiological Mechanisms: Pickar and Bolton [14] proposed that paraspinal sensory input directly influences central nervous integration processes in reflex activity, motor function, pain, and potentially autonomic neurons. Mechanical stimulation from manual therapy may alter peripheral sensory input from paraspinal tissues, triggering interactions between peripheral and central nerves that modify central integration processes to achieve

analgesic effects. Additionally, pressure applied during spinal manipulation can stimulate or inhibit mechanogated and pain afferent fibers in paraspinal tissues, including skin, muscle, intervertebral discs, facet joints, tendons, and ligaments [15-16]. Haavik et al. [17] demonstrated that chiropractic spinal manipulation can filter abnormal pain signals from cervical spondylosis and modulate sensorimotor integration processes in the postcentral gyrus, thereby relieving sensorimotor integration deficits caused by cervical pain.

Based on these findings, we believe the manual therapy protocols, dosage recommendations, and specific clinical workflows emphasized in this Guideline hold significant reference value and clinical relevance for domestic NP management. Manual therapy for NP is supported by both biomechanical and neurobiological mechanisms, and domestic literature and expert consensus already support its feasibility and scientific validity. Building upon Guideline recommendations, further investigation into the therapeutic mechanisms, safety, and operational standards of manual therapy for NP through high-quality clinical evidence will facilitate domestic clinical efficacy observation and promote the application of manual therapy in NP clinical practice.

We reviewed NP-related clinical guidelines from the past decade, summarizing their recommendations for manual therapy (see). As shown, domestic and international guidelines generally recommend manual therapy for NP, primarily for chronic phase management. This Guideline focuses on non-surgical therapies for NP, specifically selecting highly recommended manual therapy techniques as its subject. It elaborates on manual therapy for NP from diagnosis, treatment, and precautions perspectives, enriching the content of manual therapy while providing constructive references for standardizing domestic NP manual therapy protocols. Regarding diagnosis, the Guideline discusses history, symptoms, signs, and imaging—broadly consistent with domestic perspectives on NP —though domestic literature emphasizes cervical muscle status, with electromyography and musculoskeletal ultrasound playing increasingly important roles not mentioned in the Guideline [18-19]. Regarding treatment, the Guideline provides recommendations stratified by disease phase, advocating multimodal combined therapy including manual therapy, health education, and functional exercise for acute and subacute NP, with regular assessment guiding treatment modifications. However, due to insufficient high-quality evidence, the Guideline does not provide specific operational standards for manual techniques, offering only “three sessions per week for four weeks of multimodal therapy”as an optimal dosage reference for clinical practice. For functional exercise within multimodal therapy, the Guideline recommends yoga training once weekly for nine weeks, though this approach is primarily suitable for younger patients and less applicable or accessible for elderly patients. Regarding precautions, due to the close anatomical relationship between the cervical spine and brain and variability in clinical manual techniques, there is risk of neurovascular injury causing vertebral artery dissection and stroke. Chinese scholar Long Lu emphasizes the need for standardized operational protocols for manual therapy to prevent malignant complications from technique variation or improper application [20]. Overall,

the Guideline focuses on treatment protocols and workflows but lacks standardized operational requirements for chiropractors, particularly regarding efficacy observations of various chiropractic techniques for NP from different etiologies to guide standardized practice.

Guideline	Manual Intervention	Recommendations/Notes
Diagnosis and Treatment of Degenerative Cervical Radiculopathy (2011) [21]	Manual therapy/Chiropractic	Emphasizes safety; routine imaging recommended before manipulation to reduce cerebrovascular events
WHO Western Pacific Region Traditional Medicine Treatment Guidelines for Cervical Radiculopathy (2011) [22]	Manual therapy	Multiple clinical studies show significant improvement in neck pain, ROM, and tenderness; standardization supports clinical application
Management of Neck Pain and Associated Disorders: Ontario Traffic Injury Management Clinical Practice Guideline (2016) [23]	Combined therapy (manual therapy + exercise)	Recommended for NAD (4-6 months duration); relaxation techniques not recommended for Grade I-II NAD (0-6 months)
National Clinical Guideline for Non-surgical Treatment of Recent-Onset Neck Pain or Cervical Radiculopathy (2017) [24]	Manual therapy	Weak recommendation; lacks evidence support
Neck Pain (2017) [9]	Cervical manipulation	Recommended for chronic NP with mobility deficits; subacute/chronic NP with headache (cervicogenic) or radicular pain; acute/subacute NP with mobility deficits

Guideline	Manual Intervention	Recommendations/Notes
Expert Consensus on Classification, Diagnosis, and Non-surgical Treatment of Cervical Spondylosis (2018) [11]	Traditional Chinese manual therapy	Recommended with caution; rotational techniques risk spinal cord injury
Best-Practice Recommendations for Chiropractic Management of Neck Pain (2019) [8]	Manual therapy	Recommended for acute/subacute NP; optimal frequency lacks evidence; chronic NP: 60 min/session, 3×/week for 4 weeks; NAD/WAD: 3×/week for 4 weeks; vertebral artery dissection and stroke risk acknowledged

In clinical NP practice, while this Guideline offers valuable reference, its methods should not be adopted uncritically. Clinical practice should be guided by evidence-based medicine while integrating patient and hospital realities. Based on thorough understanding of Guideline recommendations, high-quality evidence-based recommendations should be followed with appropriate operational standards, implemented clinically, and continuously validated for efficacy—such as adjusting treatment protocols based on outcome assessment and implementing systematic NP diagnostic and treatment workflows. Simultaneously, we should leverage the essence of traditional Chinese medicine, utilizing its characteristic therapeutic advantages alongside modern clinical experience. Through prospective, multicenter, large-sample randomized controlled trials comparing different interventions, we can establish follow-up assessment mechanisms to explore treatment standards and workflows suitable for domestic NP patients, thereby developing evidence-based guidelines.

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Note: Figure translations are in progress. See original paper for figures.