Practice Guide for the Management of Whiplash-Associated Disorders in Adults

June 2010 Available online: www.ccachiro.org

This material was developed by the Guideline Development Committee (GDC) under the auspices of The Canadian Chiropractic Association and the Canadian Federation of Chiropractic Regulatory and Education Accrediting Boards, Clinical Practice Guidelines Development Initiative (The CCA•CFCREAB-CPG).

THE FEDERATION
CANADIAN FEDERATION OF CHIROPRACTIC REGULATORY AND EDUCATIONAL ACCREDITING BOARDS

LA FÉDÉRATION
LA FÉDÉRATION CHIROPRATIQUE CANADIENNE DES ORGANISMES DE RÉGLEMENTATION PROFESSIONNELLE ET D'AGRÉMENT DES PROGRAMMES D'ENSEIGNEMENT

Practice Guide for the Management of Whiplash-Associated Disorders in Adults

R. Bryans, BA, DC (Guidelines Development Committee Chair);
E. Anderson-Peacock, BSc, DC; M. Descarreaux, PhD, DC; M. Duranleau, DC;
H. Marcoux, DC, DABCO, FCCO(C); B. Potter, BSc, DC; R. Ruegg, BSc, PhD, DC;
L. Shaw, BSc, MSc, PhD; R. Watkin, BA, LLB; and E. White, MSc, DC

Table of Contents

Introduction

Whiplash trauma occurs with sudden acceleration or deceleration of the head and neck relative to other parts of the body, typically during vehicle collisions or other mishaps. The term 'Whiplash-Associated Disorders' (WAD)[1,2] describes the cluster of signs and symptoms resulting from this type of injury which may include neck pain, stiffness, tenderness, decreased range of motion, point tenderness, headache and neurological complaints.

This guide was developed as a resource for practitioners to support the best possible care for WAD patients.

As they are fundamental to evidence-informed practice,[3,4] the following were considered in developing this guide:

1. Evidence reviewed from published literature on effective chiropractic care for adults with WAD.
2. Knowledge of the patient; including pain history, and cultural, gender, age, socioeconomic and psychological factors.
3. Chiropractors' clinical experience as garnered by the Guidelines Development Committee (GDC) co-authors.

Chiropractors are often the health professionals who are the first point of contact for injured patients. This guide is a supportive tool for chiropractors and their patients, and not a set standard to dictate practice. The guide links available published evidence to clinical practice, and is only one component of a well-informed approach to patient care. Not all chiropractic treatments are covered in this guide due to gaps in the clinical literature. A journal version[5] is also available that describes the GDC's research and methods for assessing treatment options for WAD in adults.

It is hoped that the recommendations will result in improved effectiveness of the chiropractic treatment of WAD and will allow chiropractors the ability to generalize treatment knowledge from one patient to the next. It is expected that the recommended treatments will support the best possible clinical outcomes including rapid recovery from pain, impairment and disability; reduced costs – specifically from the reduced use of ineffective treatments; more rapid return of patients to full functional capacity; increased patient safety; and increased satisfaction among patients and health care payers.

Supporting the Best Possible Care:
Key Points Summary

- The goal of this guide is to improve the effectiveness of the chiropractic treatment of WAD and allow chiropractors the ability to generalize treatment knowledge from one patient to the next.
- Approximately 90% of patients with whiplash injuries are diagnosed as WAD-2.
- The WAD-Plus model refers to WAD grade plus three other important dimensions relevant to patient care: time since injury, pain experience and chronicity factors. The assessment of each of these dimensions will help determine the frequency, dosage and duration of treatment modalities.
- This guide does not provide a comprehensive review of all chiropractic treatments. Any omissions reflect gaps in the clinical literature.
- Three clinical presentations during the course of care require immediate emergency referral:
  - Sudden sharp neck or occipital pain unlike any previous pain
  - Sudden severe and persistent headache unlike any other headache
  - Signs and symptoms of neurovascular impairment
- This guide should be used as a resource in care delivery. It is a "living document" and subject to revision with the emergence of new literature. It is not a substitute for a practitioner's clinical experience and expertise.

Assessing WAD Grade in New Patients

When patients arrive in the emergency room or at their primary care provider's office following an accident, approximately 90% of those with whiplash injuries are diagnosed as having WAD-2. WAD-2 is assigned to whiplash injuries with neck stiffness or pain with restricted cervical ranges of motion (cROM), musculoskeletal signs and substantial interference with normal activities of daily living (nADL). As these injuries and symptoms fall well within the scope of chiropractic care, this is the type of whiplash injury that practitioners encounter most often.

Figure 1: Assess WAD Grade Prior to Treatment[5]

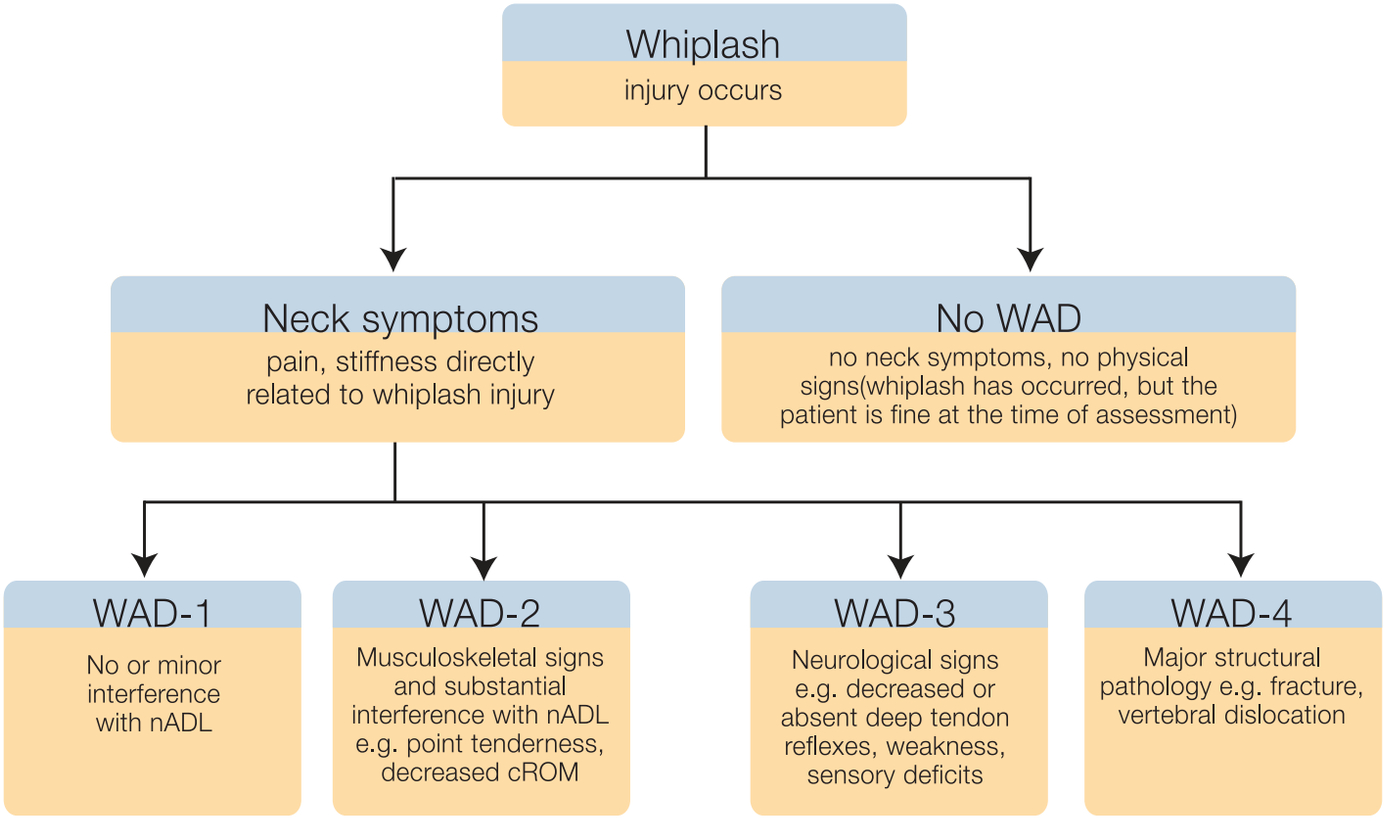
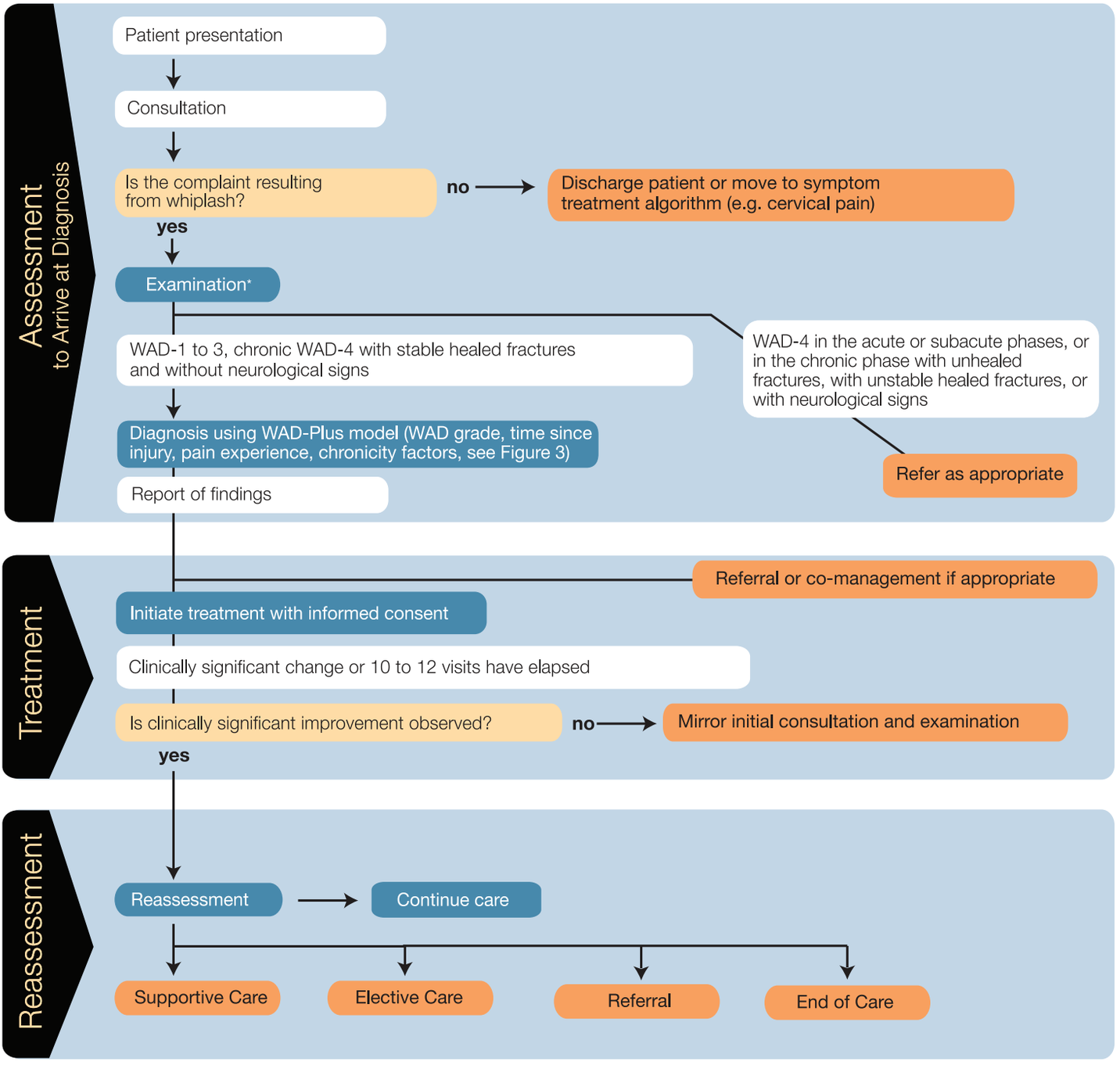


Figure 1: Adapted from the work of the Quebec Task Force[1] and Bone & Joint Decade 2000-2010 Task Force on Neck Pain and its Associated Disorders.[7] WAD grades range from WAD-1 to WAD-4 with all symptoms directly related to whiplash injury. The least serious, WAD-1 encompasses symptoms of neck stiffness or pain. WAD-2 includes symptoms of neck pain, stiffness or tenderness, with musculoskeletal signs (point tenderness, decreased cROM, and symptoms substantially interfere with nADL). WAD-3 includes neck pain, decreased or absent deep tendon reflexes, weakness, sensory deficits or other neurological signs. WAD-4 is determined to be the most serious and when patients seek care in the acute or subacute phase of injury with unhealed fractures, unstable healed fractures or increasing neurological symptoms, immediate referral to the appropriate professionals is necessary. Patients with chronic WAD-4 with stable healed fractures and without neurological signs can be assessed for chiropractic treatment.

Treatment Algorithm

Figure 2. Patient Assessment, Treatment and Reassessment

Follow the steps to guide patient assessment, diagnosis, treatment and reassessment. The selection, frequency, dosage and duration of treatment modalities will determine optimal management of each patient.



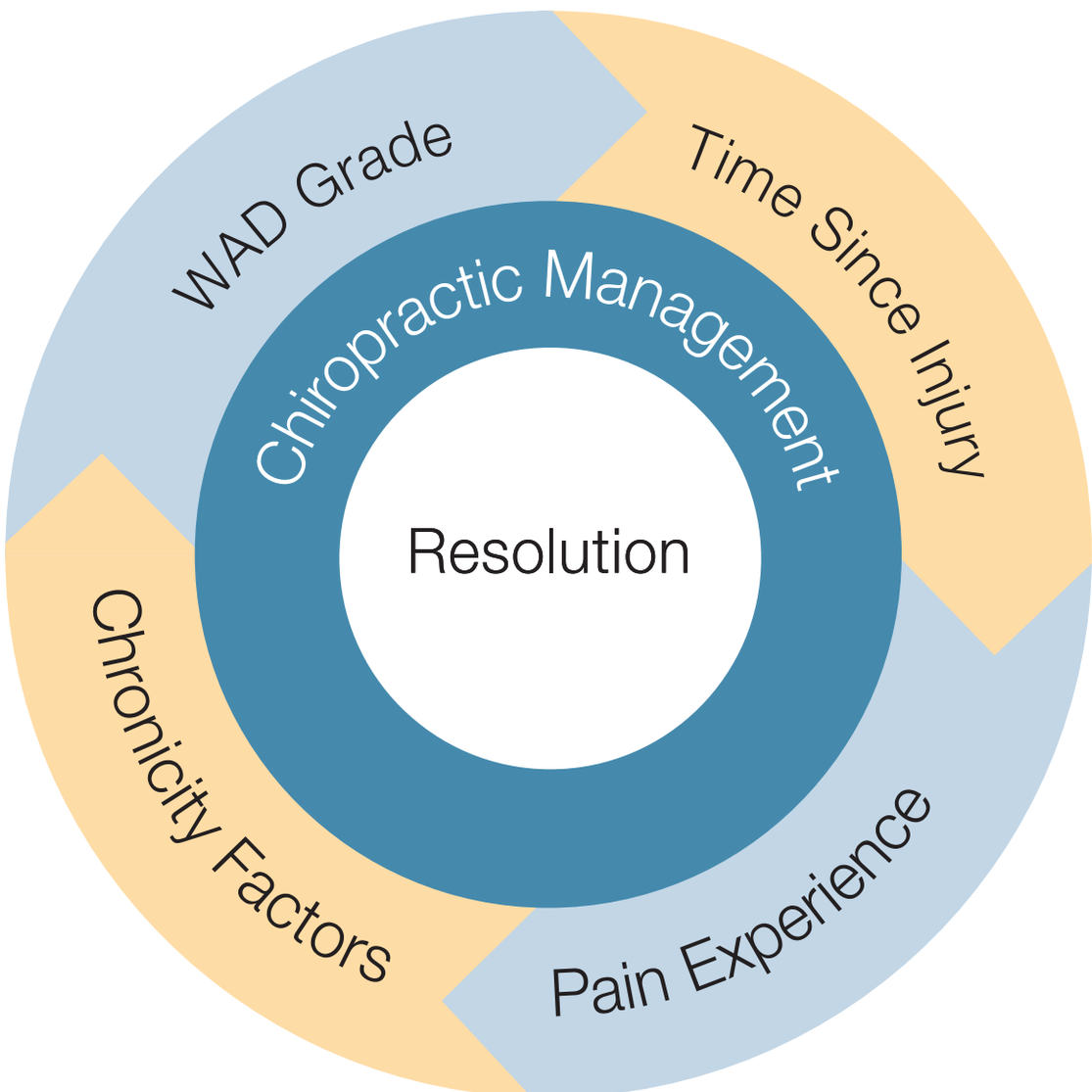
*Examination may include either Canadian C-Spine Rule or NEXUS Low-Risk Criteria[10]

Using the WAD-Plus Model to Enhance the Delivery of Care

An expanded model of care is recommended. The term "WAD-Plus" refers to this model and includes WAD grade plus three other important dimensions of patient care: time since injury, pain experience and chronicity factors.[5]

After determining a patient's WAD grade, evaluate time since injury, pain experience, and chronicity factors. The assessment of each of these WAD-Plus dimensions will affect the selection, frequency, dosage and duration of treatment modalities.

Figure 3: The WAD-Plus Model[5]



The WAD-Plus model takes into consideration (1) WAD grade (2) time since injury (3) pain experience and (4) chronicity factors

Chiropractic Management

These treatment recommendations have been developed based on components fundamental to evidence-informed practice.[3-4]

WAD Grade

- It is very strongly recommended that practitioners assess a patient's WAD grade prior to treatment (Figure 1).
- After determining the WAD grade, evaluate factors potentially affecting WAD.
- Establish the grade of a new patient's WAD in view of any earlier grading for the same disorder, because a disorder that is symptomatically a mild grade may be a resolving disorder of a more severe grade.
- Reconsider a patient's WAD grade at each reassessment. Reclassification to a higher grade may be necessary due to a delayed onset of symptoms.

Time Since Injury

- Determine a patient's time since injury and phase of healing prior to treatment:
    - acute (< 7 days)
    - subacute (1 week to 3 months)
    - chronic (> 3 months)
- Be mindful that each patient heals at a different rate and time elapsed since injury is only an estimate of phase of healing. Tissue healing may be delayed in a WAD patient who is otherwise ill or who experiences an acute exacerbation of an underlying chronic condition. For example, a patient who presents with an inflammatory flare-up should be treated with an acute clinical approach for that period.

Pain Experience

- Assess the proportion of psychosocial pain prior to treatment:
    - If clinical judgment suggests that a patient has a high proportion of psychosocial pain, perform a valid test to confirm the assessment. The GDC deemed that at least several tools[5] are helpful in determining the proportion of psychosocial pain within a patient's pain experience. These include the Bournemouth Questionnaire, McGill Pain Questionnaire, Self Efficacy Scale and Pain Catastrophizing Scale.
    - If a patient has a high proportion of psychosocial pain, focus on multi-disciplinary management of cognitive or behavioral components outside of chiropractic care.

Chronicity Factors

- Determine a patient's risk for chronic WAD by collecting information about chronicity factors[2,5] such as:
    - Demographic and socioeconomic factors: Increasing age in years, lower educational level, female gender.
    - Prior health or pain status: Prior cervical pain or headache before injury predicts greater pain or poor recovery.
    - Symptom severity: Initial cervical disability and high pain immediately after injury predicts poor recovery.
    - Psychologic and social factors: Passive coping predicts greater pain or poor recovery; depression, kinesiophobia, catastrophizing and initial post-injury anxiety predicts poor recovery; Low self-efficacy predicts greater pain or poor recovery.
    - Compensation and legal factors: Are predictive of poor recovery.
    - Health behaviors and interventions: Frequent post-injury use of health care is associated with poor recovery.

Treatment Recommendations

For Patients with WAD-1 to -3 or Chronic WAD-4 with Stable Healed Fractures and without Neurological Signs

√ Treat all WAD patients with caution. Caution is defined as initiating or continuing with a treatment only after an assessment indicates that risks associated with administering a treatment are not elevated.

√ Refer to Figures 4 to 7 and corresponding text to determine administration of HVLA manipulation and other treatment modalities.

√ Base the frequency, dosage and duration of selected treatments on your clinical experience and the patient's specific situation.

√ All acute patients benefit from supervised and unsupervised cervical range of motion (cROM) exercise, instruction and information tools. Exercise protocols vary widely in the literature. For this reason practitioners should base treatment on clinical experience and on a patient's specific situation.

√ Balance passive and active care based on each patient's stage of tissue healing as suggested by time since injury. Care becomes increasingly active with time.

√ Encourage the resumption of normal activities of daily living.

√ Provide chiropractic treatment in the context of multidisciplinary management with qualified practitioners when chiropractic specialists, medical management, psychological counseling, acupuncture, occupational therapy or other approaches are required.

√ When choosing 2 or more outcome-equivalent treatments, choose the one that is least likely to contribute to the patient's propensity for chronic WAD. The treatment that is less complex and less costly is recommended if both treatments suggest similar impact on chronicity.

√ Where Figures indicate a treatment modality is in conflict with a treatment that a practitioner has determined is appropriate, this may reflect a limitation in the available published evidence.

√ Treat 2 to 5 times per week unless a specific justification suggests otherwise.

√ Reassess upon any clinically significant change or within 10 to 12 visits (see Treatment Algorithm in Figure 2).

√ Refer to a chiropractic specialist recognized by the CFCREAB when uncertain about the type of care that should be recommended or the risk of adverse events.

√ Continue with treatment only if a patient chooses supportive care once the best possible clinical improvement is reached, even if not all clinical goals are met.

√ Continue with care only if a patient chooses a program of elective care once all clinical goals are met.

Practical Treatment Advice: Administering High Velocity Low Amplitude (HVLA) Manipulation and Adjunctive Therapies

Recommendations on the use of HVLA manipulation in treating WAD are based on expert opinion. The GDC's focus on HVLA is based on treatment data showing that most chiropractic adjustments involve a high velocity, low amplitude manipulation[6]. Information on other treatment modalities is extracted from the published clinical literature.[5] This guide does not provide a comprehensive overview of all chiropractic treatments; any gaps reflect deficiencies or omissions in the clinical literature.

Why Consider Chronicity Factors?

Identify chronicity factors[2,5] to enhance decisions around multimodal treatment, e.g. high pain immediately after injury; initial cervical disability; history of gross body pain and pain medications; passive coping style; depressed mood; fear of movement; low self-efficacy. Chronicity factors are important to consider because they emphasize the relational aspects of chiropractic care.

Knowledge of a patient's risk for chronicity in the acute phase will not change immediate care, but will prepare the practitioner and patient for a different pattern of care once healing has progressed. Initiate or tailor decisions around multimodal treatment during or after the subacute phase.

Published evidence suggests that in the presence of chronicity factors:

- use more supervised exercise
- use more cognitive behavioral therapy (CBT)
- use more instruction within a multimodal treatment regimen for WAD-3; though less instruction or information tools for WAD-1 or WAD-2
- use less electrotherapy (acute)

Pharmacotherapy is used by almost all patients

There is limited published evidence on the combination of pharmacotherapy and chiropractic management of WAD. Caution patients about overexerting themselves while exercising or when involved in other activities of daily living as pain may be masked by analgesics while vulnerable tissue damage remains.

How to Use Figures 4 to 7

Figures 4 to 7 use the parameters of the WAD-Plus model to illustrate optimal administration of a cervical HVLA manipulation. Potential adjunctive therapies are described below each figure.

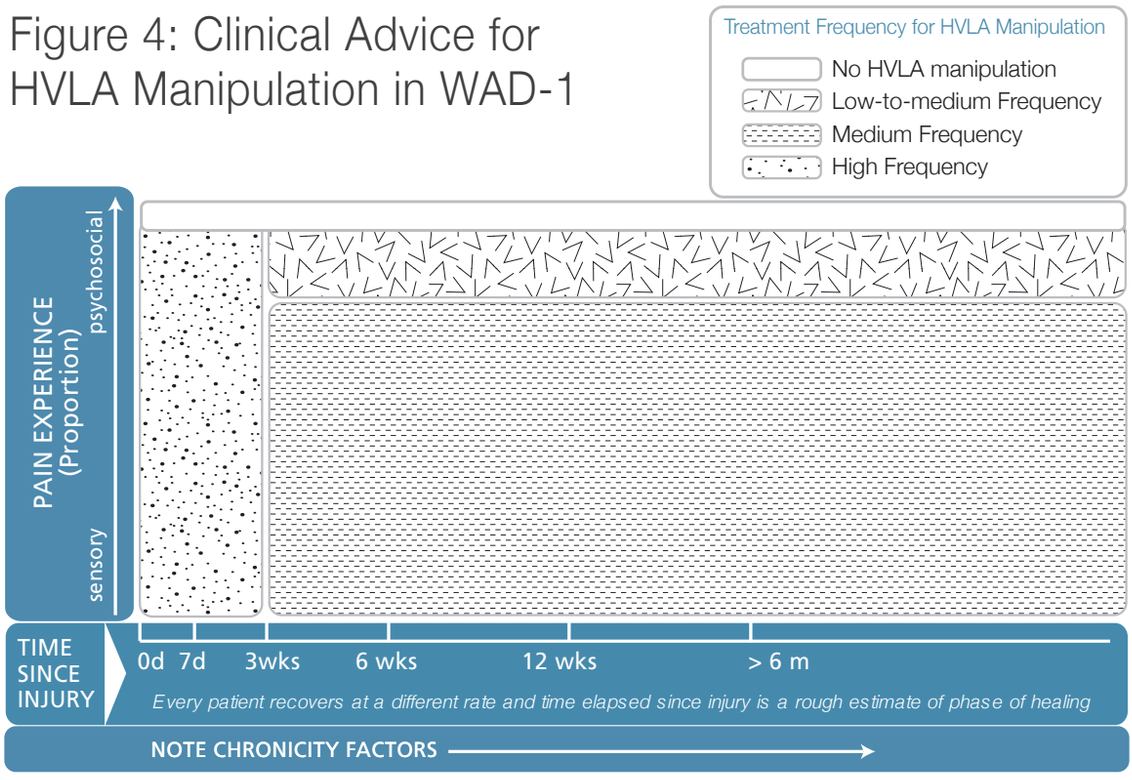
Choose the Figure that corresponds to the appropriate WAD grade for each patient, then consider the factors affecting WAD (time since injury, pain experience, chronicity factors) to determine treatment options.

The Figures are intended for use as a resource in the care of WAD and do not serve as a substitute for a practitioner's clinical experience. Zones of treatment are illustrative only.

Strict borders do not differentiate one treatment approach from another.

The duration of care should respect the Treatment Algorithm (Figure 2). This does, however, vary patient to patient (e.g. clinically significant change or 10-12 visits prior to reassessment).

Figure 4: Clinical Advice for HVLA Manipulation in WAD-1



No HVLA manipulation at any time since injury if pain is psychosocial in WAD-1.

Consider HVLA manipulation with low-to-medium frequency for patients with subacute-to-chronic WAD-1 when pain experience is predominantly psychosocial.

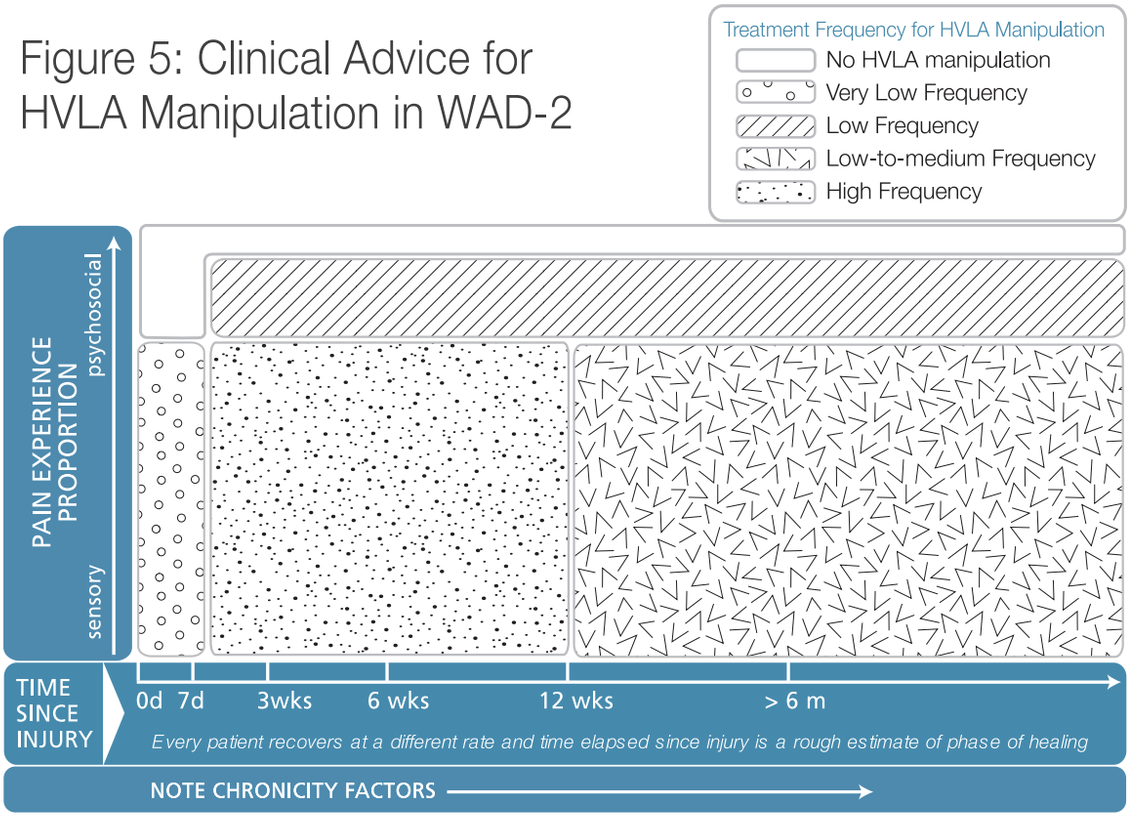
Consider HVLA manipulation with medium frequency for subacute-to-chronic WAD-1 when pain is predominantly sensory with moderate contribution from psychosocial pain.

Consider HVLA manipulation with high frequency for patients with acute-to-subacute WAD-1.

RECOMMENDATIONS FOR ADJUNCTIVE TREATMENTS IN WAD-1:

- Instruction and information tools at all times.
- cROM exercise at all times; all other exercise > 7 days post-injury.
- Electrotherapies in the acute-to-subacute phases when pain experience is sensory with moderate contribution from psychosocial pain.
- Multidisciplinary management with appropriate counseling (e.g. cognitive behavioral therapy) during subacute and chronic phases when pain experience is predominantly psychosocial.

Figure 5: Clinical Advice for HVLA Manipulation in WAD-2



No HVLA manipulation in the acute phase with predominantly psychosocial pain, or at any time since injury if pain is primarily psychosocial in nature.

Consider HVLA manipulation with very low frequency for patients with acute WAD-2 when pain is predominantly sensory.

Consider HVLA manipulation with low frequency for patients with subacute-to-chronic WAD-2 when pain experience is predominantly psychosocial.

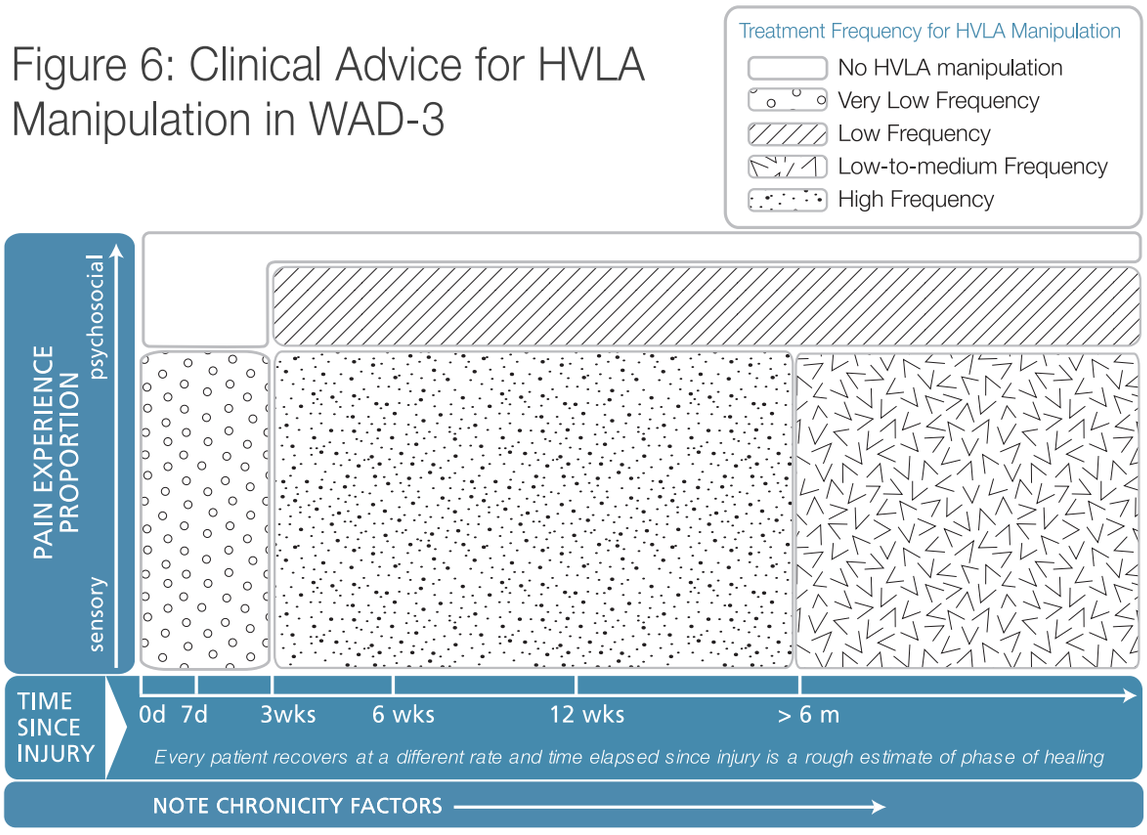
Consider HVLA manipulation with medium frequency for patients with chronic WAD-2 with predominantly sensory pain.

Consider HVLA manipulation with high frequency for patients with subacute WAD-2 when pain is predominantly sensory.

RECOMMENDATIONS FOR ADJUNCTIVE TREATMENTS IN WAD-2:

- Instruction and information tools at all times.
- cROM exercise at all times; all other exercise > 7 days post-injury.
- Electrotherapies in the acute-to-subacute phases when pain experience is sensory with moderate contribution from psychosocial pain.
- Multidisciplinary management with appropriate counseling (e.g. cognitive behavioral therapy) during subacute and chronic phases when pain experience is predominantly psychosocial.

Figure 6: Clinical Advice for HVLA Manipulation in WAD-3



No HVLA manipulation. It is unlikely that psychosocial pain would predominate during the acute phase of WAD-3.

Consider HVLA manipulation with very low frequency for patients with acute WAD-3 when pain is predominantly sensory.

Consider HVLA manipulation with low frequency for patients with subacute-to-chronic WAD-3 when pain experience is predominantly psychosocial.

Consider HVLA manipulation with low-to-medium frequency for patients with longer-term chronic WAD-3 with predominantly sensory pain.

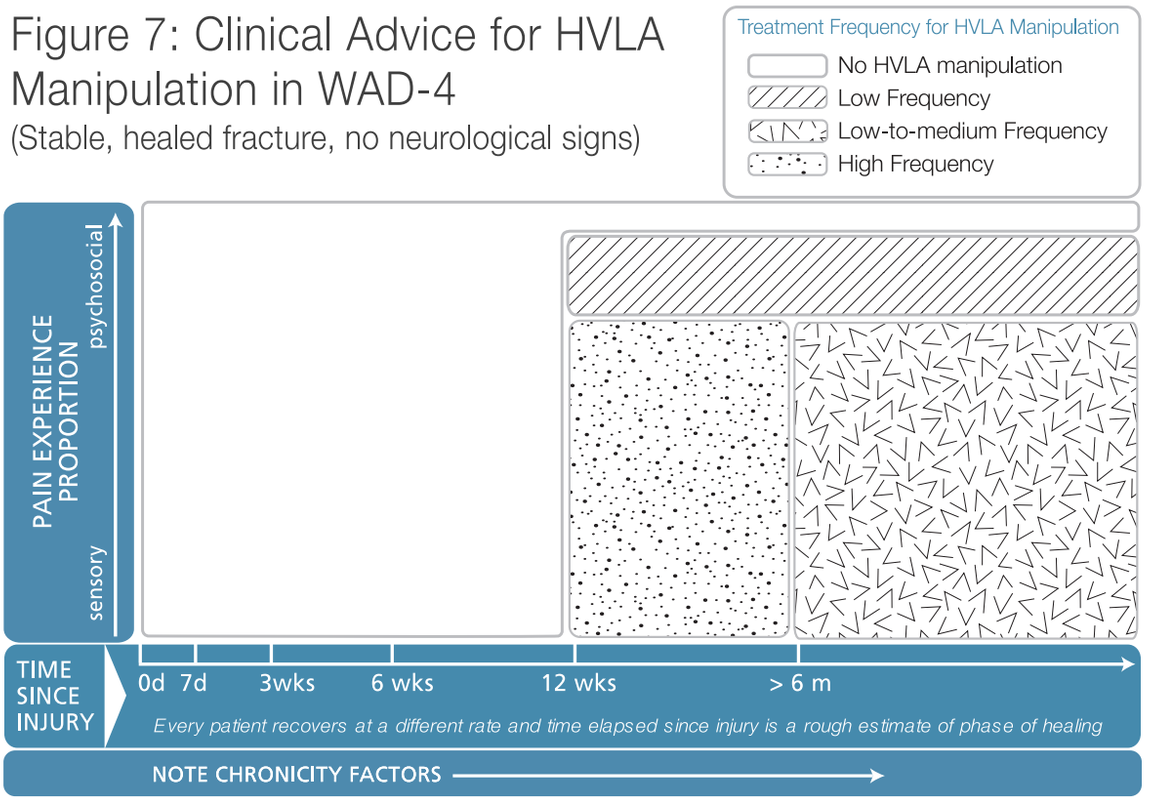
Consider HVLA manipulation with high frequency for patients with subacute-to-chronic WAD-3 when pain is predominantly sensory.

RECOMMENDATIONS FOR ADJUNCTIVE TREATMENTS IN WAD-3:

- Instruction and information tools at all times.
- All Exercise > 7 days post-injury.
- Electrotherapies in the acute-to-subacute phases when pain experience is sensory with moderate contribution from psychosocial pain.
- Multidisciplinary management with appropriate counseling (e.g. cognitive behavioral therapy) during subacute and chronic phases when pain experience is predominantly psychosocial.

Figure 7: Clinical Advice for HVLA Manipulation in WAD-4

(Stable, healed fracture, no neurological signs)



No HVLA manipulation for acute-to-subacute WAD-4 patients;
No HVLA manipulation if pain experience is primarily psychosocial.

Consider HVLA manipulation with low frequency for patients with chronic, stable WAD-4 when pain experience is predominantly psychosocial.

Consider HVLA manipulation with low-to-medium frequency for patients with longer-term, chronic, stable WAD-4 with predominantly sensory pain.

Consider HVLA manipulation with high frequency for patients with chronic, stable WAD-4 when pain is predominantly sensory.

RECOMMENDATIONS FOR ADJUNCTIVE TREATMENTS IN WAD-4:

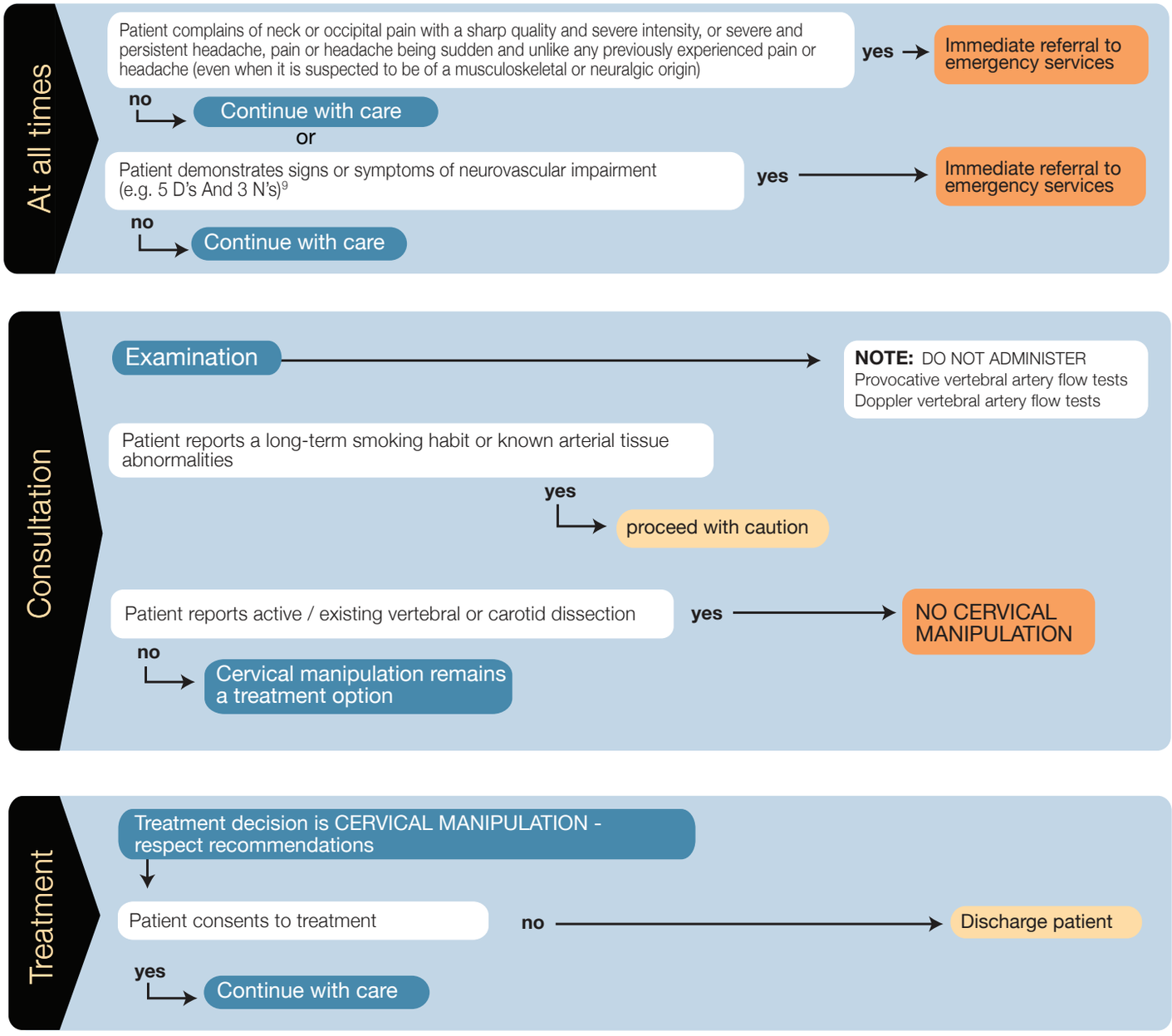
- Instruction and information tools at all times.
- All exercise in chronic phase only.
- Multidisciplinary management with appropriate counseling (e.g. cognitive behavioral therapy) during chronic phase when pain experience is predominantly psychosocial.

Risk Management Algorithm

All WAD patients should be treated with caution. Caution is defined as initiating or continuing with a treatment only after an assessment indicates that risks associated with administering a treatment are not elevated. Follow the Risk Management Algorithm when managing WAD patients (Figure 8).

Figure 8:

Path Originates In Clinical Decision Algorithm Stage



Chiropractors care for a wide variety of patients and may encounter any number of health-related concerns. At times, these health concerns (diagnosed or undiagnosed) may result in a non-treatment-related adverse event before, during or after a chiropractic treatment. Immediate, in-depth consideration of possible explanations is recommended when experiencing an adverse event. Reconsideration of treatment options or referral to the appropriate health services may be required.

Managing the Risk of Adverse Events

A complete list of signs or symptoms indicating adverse events in treating neck pain is beyond the scope of this practice guide, and more detailed information is available elsewhere.[8]

It is very strongly recommended that practitioners refer a patient to a colleague if they are uncertain about managing the risk of an adverse event associated with a treatment modality.

When managing risk, there are three situations that warrant immediate discontinuation of treatments and referral to emergency health services. If any of the following signs are noted, it is very strongly recommended that immediate action be taken because they suggest either vertebrobasilar insufficiency or vertebral artery dissection.

- During the course of care, even if it is not considered a vascular issue, a patient complains of a sudden, sharp and severely intense neck or occipital pain unlike any pain they have ever experienced.

- Even when it is not suspected to be of a vascular nature, the patient complains in the course of care of a sudden, severe and persistent headache unlike any previously experienced.

- A patient shows signs or symptoms of neurovascular impairment eg. unilateral facial paresthesia, objective cerebellar signs, (ataxia, dysdiadokokinesia), lateral medullary signs, (dysphagia, dysarthria) and/or visual field defects (diplopia).

Any time that a patient demonstrates vertigo, immediately investigate for signs of neurovascular impairment. If no neurovascular impairment is present for the patient experiencing vertigo, extreme vigilance is recommended in treating the patient because the risk for neurovascular impairment may remain. The GDC recommends against provocative vertebral artery function tests to determine the risk of neurovascular impairment because these tests lack predictive value.

- Carefully monitor for neurological signs or symptoms in patients with WAD-3. Increasing neurological deficits may require referral to the appropriate health services.

- Suspend care for patients with WAD-4 in the acute phase or chronic phase with unhealed fractures, with unstable healed fractures, or with increasing neurological signs and refer to appropriate services.

Signs of neurovascular impairment may include the 5D's And 3N's: dysarthria, dysphagia, dizziness, drop attacks, diplopia, ataxia, nystagmus, numbness, nausea.[9]

Questions and Answers with the Guidelines Development Committee (GDC)

The "WAD-Plus" model is complicated. Why do I need to consider all this before beginning treatment?

WAD is complex with an evolving response to treatment, most obviously because of tissue healing over time and the changing nature of pain symptoms. WAD is a disorder where some parameters have an evolving relationship to the precipitating whiplash, and thus also to treatment. This adds greatly to the complexity of managing WAD. An evidence-based model aligned to the dimensions of WAD grade, time since injury, pain experience, and chronicity factors addresses these complexities and organizes care with respect to a patient's clinical context.

How do I use the “WAD-Plus” model to evaluate how my patient is doing?

The model helps flag when a patient is improving on one dimension, but not another, and care can be tailored accordingly.

Does this guide mean that every patient must have 10 to 12 treatments before reassessment?

No. Any significant change in a patient’s condition suggests reassessment.

What are the measures of patient progress?

Generally, decreasing severity of signs and symptoms of WAD, reduced risk factors for chronicity and a reduced proportion of psychosocial pain within the patient's overall pain experience indicate improvement.

I have a subluxation-based practice. What use is this guide to me?

The sequence of assessment, diagnosis, treatment, and reassessment is relevant to your management of the patient regardless of your focus.

If a treatment is not present in the guide, does that mean I should not use it?

If a treatment is not mentioned in the guide, it is because we did not find any clinically important evidence to comment about it. You should use your clinical judgment and the patient's best interests to decide whether and how to use the treatment.

What should I do if my treatment does not fit well with the categories described by the "WAD-Plus" model?

The sequential process of assessment, diagnosis, treatment, and reassessment does not change. The specific treatments chosen must be adapted to each patient, reflecting the idiosyncratic nature of pain, using your clinical judgment and knowledge of the patient's best interest. However, this guide reflects a well-substantiated consensus about treatment options based on current available evidence. As such, it is reasonable to expect chiropractors should be prepared to justify interventions outside of this consensus.

What if my patient has associated co-morbid conditions? Should I use this guide?

While respecting the recommendations, if the co-morbidity falls within your scope of practice, use your clinical judgment and knowledge of the patient's best interests to determine treatment. If the co-morbidity falls outside your scope of practice, make sure that the patient is seen concurrently by the appropriate professional.

How can I decide between two equally recommended treatments?

When choosing between two or more outcome-equivalent treatments (effectiveness), use the one that is less likely to contribute to chronicity, and then the one that is less complex and costly.

How do I treat a patient with chronic WAD-4 with stable healed fractures and neurological signs?

The presence of neurological signs in these patients makes each case so unique that the GDC is unable to establish a generalized guidance. However, when there are no neurological signs, use Figure 7 as guidance.

Questions and Answers

This is a chiropractic guide. Why mention pharmacotherapy?

The reality is, the majority of the evidence reviewed addressed patients receiving pharmacotherapy, demonstrating that pharmacotherapy is a common aspect of the current therapeutic context for WAD. Thus, from the standpoint of interpreting the evidence, as well as considering recommendations in the context of today's practice, pharmacotherapy needs to be considered.

Can I be sued more easily if I don't follow this guide?

This guide is not a standard tacitly 'set' by others or a standard that is set by your regulatory board. This guide describes treatment practices supported by the current evidence. A journal article[5] of this work states that, because of the lack of studies, it does not cover the full extent of chiropractic treatment related to the cervical spine in dealing with WAD. Not all practice elements are covered in this guide and, thus, the GDC considers that this guide cannot be used to limit practice.

I'm concerned about the lack of evidence supporting the treatment of WAD. What can the profession do about this?

We very strongly recommend that chiropractors and the profession continue to show leadership by supporting and funding high-quality, clinically applicable research.

Do I have to follow the guide 'to the letter'?

Although practice guidelines can link the best available evidence to good clinical practice, they are only one component of a well-informed approach to providing the best possible care. Clinical Practice Guides are not standards that dictate practice, but rather supportive guides and tools for chiropractors and their patients. Each guideline the CCA•CFCREAB-CPG Initiative is developing and deploying will reflect a well-substantiated consensus about treatment options based on current available evidence.

Does this guide's limitation to those over 18 years of age mean that chiropractic treatment of those under the age of 18 is inappropriate?

No. This guide does not intend to restrict chiropractic care of WAD to those over 18. Our recommendations are based on an analysis of research for individuals 18 years of age and older, and thus no recommendations for or against the treatment of those under 18 are made.

References

1. Spitzer WO, Skovron ML, Salmi LR, et al. Scientific monograph of the Quebec Task Force on whiplash-associated disorders: redefining 'whiplash' and its management. Spine. 1995;20 Suppl 8:S1-73.
2. Carroll LJ, Holm, LW Hogg-Johnson S, et al. Course and prognostic factors for neck pain in whiplash-associated disorders (WAD): results of the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders. Spine 2008;33(4 Suppl):S83-92
3. The Canadian Chiropractic Association and the Canadian Federation of Chiropractic Regulatory Boards Clinical Practice Guideline Development Initiative (The CCA•CFCRB-CPG) development, dissemination, implementation, evaluation, and revision (DevDIER) plan. J Can Chiropr Assoc. 2003;48(1):56-72.
4. Sackett DL, Straus S, Richardson S, et al. Evidence-based medicine: how to practice and teach EBM. 2nd ed. Churchhill Livingstone London UK: 2000.
5. Shaw L, Descarreaux M, Bryans R, et al. A systematic review of chiropractic management of adults with whiplash-associated disorders: Recommendations for advancing evidence-based practice and research. Work 2010;35(3):369-394.
6. Coulter ID and Shekelle PG. Chiropractic in North America: A Descriptive Analysis. J Manipulative Physiol Ther. 2005;28(2):83-89.
7. Guzman J, Haldeman S, Carroll LJ, et al. 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. Spine 33 2008;(4 Suppl):S199-213.
8. Anderson-Peacock E, Blouin JS, Bryans R, et al. Guidelines Development Committee (GDC), The Canadian Chiropractic Association and the Canadian Federation of Chiropractic Regulatory Boards, Clinical Practice Guidelines Development Initiative (The CCA•CFCRB-CPG). Chiropractic clinical practice guideline: evidence-based treatment of adult neck pain not due to whiplash. J Can Chiropr Assoc. 2005;49(3):158-209
9. Terrett AGJ. Current concepts in vertebrobasilar complications following spinal manipulation. 2nd ed. NCMIC Group Inc. West Des Moines , Iowa. 2001.
10. Stiell IG, Clement CM, McKnight RD, et al. The Canadian C-spine rule versus the NEXUS low risk criteria in patients with trauma. N Engl J Med. 2003 Dec 25;349(26):2510-8.