

Clinical guidelines for best practice management of acute and chronic whiplash-associated disorders

Commissioned by the South Australian
Centre for Trauma and Injury Recovery (TRACsa)



November 2008



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NHMRC approval

These guidelines were approved by the CEO of the National Health and Medical Research Council on 5 November 2008, under section 14A of the *National Health and Medical Research Council Act 1992*. Approval for the guidelines by the NHMRC is granted for a period not exceeding five years, at which date the approval expires. The NHMRC expects that all guidelines will be reviewed no less than once every five years. Readers should check with TRACsa for any reviews or updates of these guidelines.

Disclaimer

This document is a general guide to appropriate practice, to be followed only subject to the clinician's judgement in each individual case.

The guidelines are designed to provide information to assist in decision-making and are based on the best information available at the date of compilation (Assessment & Diagnosis - March 2007, Prognosis - June 2007, Treatment - March 2007).

The guidelines are not intended to have a regulatory effect.

Copies of these guidelines can be downloaded from the TRACsa: Trauma and Injury Recovery website at www.tracsa.org.au

TRACsa acknowledges the pioneering work of the NSW Motor Accidents Authority in developing *Guidelines for the management of acute whiplash-associated disorders* in 2001 and in undertaking a major revision in 2007.

Suggested citation

TRACsa: Trauma and Injury Recovery. Clinical guidelines for best practice management of acute and chronic whiplash-associated disorders. TRACsa, Adelaide: November 2008.

Short title: Clinical guidelines for the management of whiplash-associated disorders

CONTENTS

Key messages.....	i
Executive summary.....	ii
Preface: Methodological implications	1
Introduction.....	3
Purpose of the pathway	3
What is a pathway?	3
Definition of whiplash-associated disorders	4
Scope	4
When to consult the pathway	5
Target audience.....	5
Methodology.....	6
The pathway	9
The acute WAD pathway	12
The chronic WAD pathway	17
Recommendations for clinical practice.....	19
Recommendations for assessment and diagnosis	19
Recommendations for prognosis.....	24
Recommendations for treatment	31
Treatment recommendations for acute WAD	31
Treatment recommendations for chronic WAD	36
Consideration of socio-economic aspects.....	42
Appendix.....	43
Appendix 1: Membership and terms of reference of the advisory and working groups...	43
Appendix 2: Process report.....	46
Appendix 3: The NHMRC process for determining grades of evidence	50
Appendix 4: Outcome measures for the assessment of WAD	53
Pain Visual Analogue Scale.....	53
The Neck Disability Index	54
The Functional Rating Index	58
The Self Efficacy Scale	59
The Coping Strategies Questionnaire.....	60
Patient-Specific Functional Scale	61
Core Whiplash Outcome Measure	63
The Kessler Psychological Distress Scale	65
The Impact of Event Scale	67
Appendix 5: Example of whiplash advice	69
Appendix 6: Exercises that will help	71
Appendix 7: Outline of a cognitive behavioural approach.....	74
Abbreviations and acronyms	75
Glossary.....	77
Bibliography	79

List of tables

Table 1	Quebec Taskforce Classification of Grades of WAD.....	4
Table 2	Course of recovery after whiplash.....	24
Table 3	Factors associated with poor prognosis.....	26
Table 4	Factors not associated with prognosis.....	27
Table 5	Treatment recommendations for acute whiplash.....	31
Table 6	Treatment recommendations for chronic whiplash.....	36
Table 7	Designations of levels of evidence.....	50
Table 8	NHMRC Body of evidence assessment matrix.....	51
Table 9	NHMRC Grades of evidence for recommendations.....	52

List of figures

Figure 1	Initial assessment of a whiplash-associated disorder.....	10
Figure 2	Acute WAD pathway – up to 12 weeks.....	11
Figure 3	Initial or re-assessment of chronic WAD >12 weeks post MVA	15
Figure 4	Chronic WAD pathway > 12 weeks post MVA	16
Figure 5	The Canadian C-Spine Rule.....	21
Figure 6	Pooled mean pain scores (VAS) over time	25
Figure 7	Pooled mean disability scores (NDI) over time	25

KEY MESSAGES

The *Clinical guidelines for best practice management of acute and chronic whiplash-associated disorders* presents a series of recommendations and a treatment pathway for the optimal management of adults who experience acute or chronic neck pain, known as a whiplash-associated disorder, following a motor vehicle collision or other accident.

The guidelines emphasise a number of key themes and treatment priorities:-

- Undertake a thorough assessment and physical examination to correctly diagnose the condition
- Apply the Canadian C-Spine rule to determine whether an X-ray is required to confirm the diagnosis of a fracture or dislocation
- Classify the grade of whiplash
- Consider the role of radiological imaging and special tests
- Identify clinical and psychosocial risk factors, and consider these in formulating a management plan and selecting treatment components
- Adopt a positive and supportive approach, and acknowledge that the patient has symptoms
- Inform and educate patients and emphasise, in a practical way, the importance of staying active (promote active rather than passive treatment)
- Consider the ability to monitor and evaluate treatment and progress (use outcome measures)
- Take action if there is lack of improvement
- Promote self management of the condition

The guidelines provide directions for assessment and diagnosis, prognosis and treatment of a whiplash-associated disorder, from the point at which a patient presents to their primary practitioner. They are intended to assist health providers delivering primary care to adults with acute or chronic neck pain after a motor vehicle collision.

EXECUTIVE SUMMARY

The *Clinical guidelines for best practice management of acute and chronic whiplash disorders* presents guidelines (a pathway) for the optimal management of adults who present with acute or chronic neck pain, referred to as whiplash associated-disorders (WAD), following a motor vehicle collision. The guidelines provide directions for the assessment, prognosis and treatment for the period of a WAD injury, commencing at the point at which a patient presents to their primary practitioner. The guidelines are intended for use by general practitioners and other health professionals in primary care settings, however they are also relevant for practitioners in secondary and tertiary care settings, to whom the patient may also be referred.

Development of these guidelines was overseen by a Technical Advisory Group (TAG), using methodology consistent with National Health and Medical Research Council (NHMRC) standards. A complete guide to the methodology used to create the guidelines is provided in the accompanying *Evidence report*.¹

A Best Practice Taskforce was formed to auspice the development of the guidelines. This group comprised health professionals representing the disciplines of general medicine, orthopaedic surgery, physiotherapy, chiropractic, psychology, psychiatry, and occupational therapy, in addition to stakeholders representing the legal profession, the compensation and insurance sectors, and consumer groups. The role of the BPT was to develop a multi disciplinary consensus about recognised best practice in the treatment of soft tissue injuries, and provide recommendations to the TAG in the development of the guidelines.


Scope

The Quebec Taskforce (QTF) ² definition of whiplash associated disorders (WAD) was adopted for the purposes of this pathway. The scope of the pathway encompasses WAD Grades I to IV.

Evidence and consensus-based recommendations

The current published literature on whiplash-associated disorders is largely biomedical. There are few scientifically admissible studies that examine the role of psychological or social factors in the onset of, or prognosis for WAD. To address this limitation a number of consensus-based recommendations were included, in recognition of psychosocial factors relevant to the management of chronic pain states and soft tissue injury. These consensus points aim to enhance the assessment and treatment of WAD in a practice setting.

The time periods for review of a patient with WAD included in the guidelines are also based on consensus, and follow the recommendations developed by the Quebec Taskforce ². There was little evidence to inform the periods of review, however the timeframes outlined aim to ensure that ineffective treatment is not continued where it could possibly lead to chronicity.

Recommendations included on the basis of a consensus of expert medical and multidisciplinary opinion in the absence of an evidence base are identified with the symbol .

A Grade of Evidence, derived according to NHMRC standards (refer Table 9, page 52), accompanies recommendations included on the basis of evidence. These are identified with the grade, supporting references, and the page number where the recommendation is discussed [**Grade, Ref, p**].

Pathways

There are two pathways outlined in the guidelines. Each provides a structure for the assessment and treatment of people with WAD. The **acute pathway** is applicable to adults presenting between 0 and 12 weeks post accident (page 10). The **chronic pathway** is applicable both to adults presenting for the first time in the chronic phase (≥ 12 weeks post accident), and those who initially present in the acute phase and who continue to require treatment into the chronic phase.

Recommendations regarding the assessment, prognosis and treatment for each pathway appear in the *Recommendations for clinical practice* section (page 19).

Treatments that received a Grade A or B rating are included in the pathway under the heading *Treatments that should initially be undertaken*. Treatments with a Grade C rating are included under the heading *Treatments that may be undertaken provided there is ongoing evidence of benefit*. Treatments that had evidence against their use, and treatments for which there was an absence of evidence, and were therefore not recommended on the basis of consensus, were grouped under the heading *Treatments that should not be undertaken*. The distinction between the latter two groups is made explicit in the document.

This summary is designed to provide a brief overview of the recommendations in the guidelines, and should be read in conjunction with the information in the main body of the text, in which recommendations are outlined in detail. Further information regarding the primary evidence underpinning the recommendations is available in the *Evidence report*.¹

Recommendations for assessment and diagnosis

History taking should include; - information regarding date of birth, gender and education level of the person [**Grade A, Ref 31, 58, p 29**] the circumstances of injury and relevant crash factors; time since injury; self-reported injury severity; and prior history of neck problems, including previous whiplash injury (p 19). ☒

The routine use of a measure of pain intensity, such as the visual analogue pain scale (VAS), and a measure of disability, such as the Neck Disability Index (NDI) is recommended for all WAD patients. Copies of these outcome assessment instruments appear in Appendix 4 (page 53) [**Grade A, Ref 30-43, p 27**].

A focused physical examination is necessary for all patient visits. Results of the physical examination should be documented and include: observation of head position and posture; palpation of the neck for tender points; assessment of range of movement; testing of sensation, reflexes and muscle strength; assessment of associated injuries and co morbidities; and assessment of general medical condition including psychological state. More specialised physical assessments may include;- joint position error, cervical flexor muscle control, and widespread sensory hypersensitivity(including sensitivity to cold) (p 20). ☒

Following assessment patients should be graded as a level I, II, III, or IV according to the QTF Classification ☒. Patients with potentially poor prognosis, that is high Pain VAS scores (pain $\geq 7/10$), and high NDI scores (disability score $> 40/100$) should be noted (p 21) [**Grade A, Ref 30-43, p 27**].

The Canadian C-spine rule is the most appropriate rule to apply to determine whether X-ray of the cervical spine is required to confirm a diagnosis of fracture/dislocation **[Grade B, Ref 28, 29, p 22]**.

Measuring aspects of patient distress via the use of the Self Efficacy Scale (SES) and the Coping Strategies Questionnaire (CSQ-CAT) is recommended as part of the assessment of the psychological status of persons with whiplash. This may occur, where appropriate, at 3 to 6 week review. Copies of these assessment and outcome evaluation instruments appear in Appendix 4 (page 53). ☒

Recommendations for prognosis

Best estimates of the course of recovery of after whiplash indicate that 44% of patients have recovered at one month post injury, 65% of patients have recovered by 12 months post injury, and 75% of patients have recovered by five years post-injury. Factors associated with poorer outcome after whiplash are summarised on page 26.

High initial self reported pain intensity (eg, pain 7/10 on VAS scale) and disability (eg, NDI > 40/100) are associated with both ongoing pain symptoms and ongoing disability after whiplash. The presence of either of these factors should alert the practitioner to the potential need for more regular review of treatment or earlier referral to a specialist **[Grade A, Ref 30-43, p 27]**.

A large number of initial symptoms, and self-rated injury severity are associated with ongoing pain symptoms after whiplash **[Grade B, Ref 30, 32, 44, p 27]**.

Three psychological factors are associated with poor prognosis following whiplash:

- Low self-efficacy is strongly associated with ongoing pain [Grade A, Ref 38, 48 p 28].
- Catastrophising is strongly associated with ongoing disability [Grade A, Ref 38 40, p 28].
- Anxiety is associated with ongoing pain [Grade B, Ref 30, 32, 37, p 28].

Measuring aspects of patient distress via the use of the Self Efficacy Scale (SES) and the Coping Strategies Questionnaire (CSQ-CAT) is therefore recommended as part of the assessment of the psychological status of persons with whiplash (page 13). ☒

Lower educational level is associated with ongoing disability after whiplash **[Grade A, Ref 31, 58, p 29]**.

Increased sensitivity to cold is associated with ongoing disability after whiplash **[Grade A, Ref 41, 43 p 29]**.

Reduced cervical range of motion (ROM) is associated with ongoing disability after whiplash **[Grade B, Ref 64, 65 p 29]**.

The following factors are NOT associated with poor prognosis after whiplash:

No radiological findings have been shown to be associated with poor outcomes for persons classified as WAD Grade I-III. Radiological findings should not be used to determine prognosis after whiplash. **[Grade A, Ref 32, 45, 46: Grade B, Ref 45, 46, p 28]**.

Avoidance and depression are not associated with poor outcome after whiplash. [Grade B, Ref 30, 36, 37, 54-57, p 28].

Poor mental health is not associated with poor outcome after whiplash. [Grade A, 37, 53, p 28]

Older age is not associated with ongoing pain or disability after whiplash. [Grade B, Ref 31, 53, p 29].

Dissatisfaction at work, diverting attention, increased behavioural activity, poor physical health, and poor social functioning are not associated with poor prognosis after whiplash. [Grade A, Ref 32, 37, 38, 43, 44, 51-54, p 28].

Crash-related factors such as the speed or direction of impact, the presence of a head rest, the seating position in the vehicle, the persons awareness of the collision, and whether the vehicle was drivable are not associated with prognosis (for physical symptoms) after whiplash. Crash-related factors should not be used to determine prognosis (for physical symptoms) after whiplash. [Grade A, Ref 31, 33, 35, 39, 45, 46, 49, 51, 53, 59-63, p 29]

History of previous neck pain and reduced Range of Motion (ROM) appears not to be associated with ongoing pain symptoms after whiplash [Grade B, Ref 30, 35, 39, 44-46, 51, 49 p 29].

Recommendations for treatment: Acute WAD

Treatments that *should* be routinely undertaken

Active exercise involving functional exercises, range of motion exercises, strengthening of neck and scapular muscles and strengthening of deep neck flexors is recommended. Recommended exercises are included in Appendix 6 (page 71) [Grade A, Ref 68-73, p 32].

Advice to 'act as usual' / reassurance / education. Health professionals should provide reassurance and education (including providing videos) about the recovery process. Specifically, patients should be educated that pain symptoms are a normal reaction to being hurt, and that maintaining normal life activities and remaining active are important in the recovery process. The person should also be advised that voluntary restriction of activity may delay recovery, and that it is important to focus on improvements in function. An example of whiplash advice is provided in Appendix 5 (page 69) [Grade B, Ref 68, 70, 72, 75, 77, 78, p 32].

Treatments that *may* be undertaken where there is ongoing evidence of benefit

Passive joint mobilisation / manipulation may be given with active exercises where exercise and advice alone are not proving effective, providing there is evidence of continuing improvement. This technique should be restricted to practitioners trained in joint mobilisation and manipulation [Grade C, Ref 70, 71, 79, 80, 81, p 33].

Passive modalities (such as heat, ice and massage) ☒ and electrotherapies (including TENS, pulsed electromagnetic therapy, electrical stimulation, ultrasound and shortwave diathermy) are optional adjuncts to exercise and manual therapy in those cases where the person is not improving with active exercise or advice alone [Grade C, Ref 81-83, p 33].

Pharmacotherapy. For WAD Grade I-III simple (non-opioid) analgesics and NSAIDs can be used to alleviate pain in the short term. Their use should be limited and weighed against known side effects, which appear to be dose related [Grade B, Ref 85, p 34].

Multimodal therapy (a range of individual treatment modalities such as joint mobilisation, relaxation techniques, electrotherapies and exercises as part of a package to address individual patient deficits such as pain, loss of range of movement and loss of strength) can be used provided there is continuing evidence of benefit. Ideally these packages should include an active treatment component [Grade B, Ref 68-73, 75, 81 p 34].

Treatments that should not be undertaken

Collars should not be prescribed for WAD. If they are prescribed they should not be used for greater than 48 hours [Grade A, Ref 68-73, 75, p 34].

Treatments that *should not* be undertaken until evidence is available

Surgery (except in WAD IV). There are no indications for surgical intervention in almost all cases of acute and sub-acute WAD Grades I-III. Surgical treatment to reduce dislocation or stabilise the cervical spine may be required in WAD IV (p 35). ☒

Cervical pillows are not recommended, as there were no studies demonstrating the effectiveness of this treatment (p 35). ☒

Intrathecal and intra-articular steroid injections are not recommended, as there were no studies demonstrating the effectiveness of this treatment (p 35). ☒

There was evidence supporting the use of a high dose intravenous methylprednisolone infusion for the acute management of WAD Grade I-III [Grade B, Ref 85, 86, p 35], however the use of this treatment was not recommended given its potential side effects. ☒

Recommendations for treatment: Chronic WAD

Treatments that *should* be routinely undertaken

Advice to act as usual / reassurance. The practitioner should adopt a positive and supportive approach and acknowledge that the patient is hurt and has symptoms. He/she should advise that symptoms are a normal reaction to being hurt, and that maintaining normal life activities and remaining active are important in the recovery process. The person should also be advised that voluntary restriction of activity may lead to secondary complications and delay recovery, and that it is important to focus on improvements in function. An example of whiplash advice appears at Appendix 5 (page 69). [Grade B, Ref 89, 90, p 37].

Active exercise involving functional exercises, range of motion exercises, strengthening of neck and scapular muscles and strengthening of deep neck flexors is recommended. Recommended exercises are included in Appendix 6 [Grade B, Ref 89-91, p 37].

Treatments that *may* be undertaken where there is ongoing evidence of benefit

A cognitive behavioural approach to treatment may be useful. A basic outline of a cognitive behavioural approach is outlined in Appendix 7 [Grade C, Ref 90, 92, p 38].

Passive joint mobilisation / manipulation may be given in combination with exercise in the chronic phase provided there is evidence of continuing measurable improvement. Reliance on passive therapy alone without an 'active' component is not recommended. This technique should be

restricted to registered health professional trained in the specific methods of passive joint mobilisation and manipulation (p 38). ✓

A vestibular rehabilitation may be instituted for persons experiencing dizziness in the chronic phase [Grade C, Ref 93, p 38].

Treatment packages that are 'multimodal' in nature and address a range of patient deficits such as loss of range of motion and strength may be used provided there is continuing evidence of benefit. Such packages should include an active treatment component in the chronic phase (p 39). ✓

Radiofrequency neurotomy may be useful for chronic whiplash sufferers whose symptoms have been shown by diagnostic blocks to arise from the lower cervical joints [Grade B, Ref 94, p 39].

Subcutaneous sterile water injections may be useful in carefully selected cases. This technique should be provided by practitioners with expertise with such injections [Grade C, Ref 95, p 39].

Treatments that *should not* be undertaken

Intra-articular and intrathecal steroid injections are not recommended for chronic WAD (p 41). [Grade B, Ref 46, p 40]

Analgesic injections are not recommended for the treatment of chronic WAD (p 41). ✓

Collar immobilisation should not be undertaken with chronic whiplash (p 39). ✓

Prescribed rest is not recommended for chronic whiplash (p 39). ✓

Treatments that *should not* be undertaken until evidence is available

Surgical intervention (aside from radiofrequency neurotomy) is not recommended in almost all cases of chronic WAD Grades I – II (p 40). ✓

Cervical pillows are not recommended (p 40). ✓

The use of Botox injections in chronic whiplash is not recommended (p 40). ✓

The use of electrotherapy in the treatment of chronic whiplash is not recommended (p 41/2). ✓

PREFACE: METHODOLOGICAL IMPLICATIONS

To gain NHMRC endorsement, the *Clinical guidelines for best practice management of acute and chronic whiplash-associated disorders* were developed according to a strict methodological protocol. Only studies of whiplash-associated disorder (WAD) cohorts that satisfied rigorous methodological criteria were included. Some 30,000 titles were identified through that process. Studies from related areas of health research were, by necessity, excluded.

This methodology presented a number of limitations:

The evidence and research for WAD is largely biomechanical – there are few scientifically admissible studies that examine the role of psychological or social factors in the onset of and prognosis for WAD.³

There is evidence that in many individuals the development of WAD cannot be attributed to biomechanical mechanisms alone⁴⁻⁶ and is multifactorial in nature.³

Some researchers consider that commonalities in chronic musculoskeletal pain states outweigh the differences between these types of problems, and that common psychological and social risk factors may be present across, for instance, lower back and neck pain conditions.^{7,8}

There is evidence that post-traumatic stress and chronic pain disorders following trauma share common links.⁴

Insights from related areas of health inquiry, such as the chronic pain, neck pain, and trauma literature, may enhance our understanding of the development of acute or chronic WAD after a motor vehicle collision⁴ and inform the development of best practice treatment protocols. It is possible that common risk factors assessment and treatment approaches may be applicable for chronic whiplash-associated disorders and other chronic musculoskeletal pain states.^{7,8}

A biopsychosocial approach

A medical model views disability as a problem caused by a disease, trauma or health condition. As articulated by the World Health Organisation (WHO) International Classification of Functioning (ICF)⁹ a biopsychosocial approach emphasises that an individual's functioning in a specific domain is the result of a complex relationship between the health condition and contextual factors. The latter includes personal factors unique to the individual, and the social and natural environment in which they exist.

TRACsa and the Best Practice Taskforce (BPT) acknowledge that the WAD Guidelines currently have a biomedical emphasis that may be due to the nature of the available published evidence. In addition, the BPT also acknowledge that in adopting NHMRC inclusion criteria, the grades of evidence for some recommendations are based on a single study, or on 2 or 3 studies, and other studies were excluded. Had inclusion criteria for the literature been widened to encompass pain management or post-traumatic pain syndromes, stronger support, particularly in the area of psychological, legal or societal factors associated with prognosis and treatment, may have emerged. These are important areas for further research.

For instance, there is evidence to suggest that people who are injured and claim compensation for that injury have poorer health outcomes than people who have similar injuries but are not involved in the compensation environment.¹⁰ These findings suggest that legislative and legal factors may influence

the onset and prognosis of a WAD disorder, however a number of studies in this area were excluded due to methodological issues. In particular, the studies that were excluded from the review process had mixed or non-WAD populations.

To address these limitations, the Best Practice Taskforce included a small number consensus points in the Guidelines, in order to enhance their utility in a practice setting. Three 'Good practice points', developed on the basis of consensus, and clearly outlined in the text, were also included.

In addition, a companion document *The Whiplash-associated disorders clinical resource guide* was developed. The clinical resource guide is a concise version of the guidelines for use in day-to-day clinical practice settings. It is a non-NHMRC document that includes an extended range of good practice points highlighting psychosocial factors that may influence recovery, and contextual information derived from other relevant research, with the aim of fostering a biopsychosocial approach to the assessment and management of whiplash-associated disorders.

INTRODUCTION

The South Australian Centre for Trauma and Injury Recovery (TRACsa) has developed clinical guidelines (pathway) for the management of whiplash-associated disorders (WAD), which are the single most frequently recorded injuries among CTP claimants in South Australia. The pathway provides recommendations for the optimal management of adults with WAD over the period of their injury. This pathway draws to some extent on clinical guidelines for the treatment of acute WAD developed in 2001 by the New South Wales Motor Accident Authority (MAA).¹¹ A second edition of those guidelines has recently been published.¹² The MAA Guidelines, in turn, were based on the Quebec Task Force (QTF) guidelines, released in 1995.² The QTF focused on clinical issues, specifically risk, diagnosis, prognosis and treatment of whiplash. The QTF guidelines were largely developed by consensus and the expert knowledge of members of the QTF.

In developing this pathway a systematic review and summary of relevant literature (generally from the start of the various data bases up to mid-2007) was undertaken on the assessment, diagnosis, prognosis and treatment of people with acute and subacute (less than 12 weeks duration) and chronic (greater than 12 weeks duration) whiplash. A concerted attempt was made to objectively assess the quality of the collected studies (using National Health and Medical Research Council (NHMRC) methodology¹³) so the best decisions regarding management could be made. A complete guide to the methodology used is provided in the accompanying *Evidence report*.¹

The review of prognostic factors identified studies demonstrating that pain and disability persist in approximately half of all people incurring whiplash at three months post injury and still remain in approximately 35% of people at twelve months. Hence a positive and sympathetic approach is needed, as for many people with whiplash it is not possible to abolish all symptoms in the acute or sub-acute phase.

The review found that despite many advances in understanding the natural history and presentation of WAD, there remain some areas where the pathway must rely on a consensus of informed clinical opinion.

This pathway gives directions for assessment, prognosis and treatment for the period of a WAD injury from the point at which a patient presents to their primary practitioner. Clinical utility has been uppermost in the minds of the team working on this project.

Purpose of the pathway

The pathway is intended to assist health professionals delivering primary care to adults with acute or chronic neck pain after motor vehicle crashes (whiplash).

What is a pathway?

Kitchiner and Bundred¹⁴ define a clinical pathway as ‘...a tool that sets locally agreed clinical standards, based on the best available evidence, for managing specific groups of patients’. Pathways are used for treating patients with a wide variety of clinical conditions in primary, secondary or tertiary care (Figure 1 to Figure 4) details the Pathways for assessing and managing adults with acute or chronic WAD.

Definition of whiplash-associated disorders

The Quebec Taskforce (QTF) definition² of whiplash-associated disorders (WAD) has been adopted for the purposes of this pathway.

Whiplash is an acceleration-deceleration mechanism of energy transfer to the neck. It may result from “...motor vehicle collisions...”. The impact may result in bony or soft tissue injuries which in turn may lead to a variety of clinical manifestations (Whiplash-associated disorders).

Grades of WAD

The clinical classification provided by the QTF² is shown in the table below.

Table 1 Quebec Taskforce Classification of Grades of WAD

Grade	Classification
0	No complaint about the neck No physical sign(s)
I	Neck complaint of pain, stiffness or tenderness only No physical sign(s)
II	Neck complaint AND musculoskeletal sign(s) Musculoskeletal signs include decreased range of motion and point tenderness
III	Neck complaint AND neurological sign(s) Neurological signs include decreased or absent tendon reflexes, weakness and sensory deficits
IV	Neck complaint AND fracture or dislocation

Scope

The scope of the pathway covers WAD Grades I to IV following a motor vehicle collision. Grade IV is only considered to the extent of diagnosing the condition followed by immediate and appropriate specialist management. Referral to an Emergency Department, emergency physician, neurosurgeon or orthopaedic surgeon will be required. The pathway is applicable when WAD is the only injury or when it has occurred concurrently with other injuries.

When to consult the pathway

The pathway is relevant when an adult experiencing neck pain after a recent motor vehicle collision consults their general practitioner or other health professional. It applies when:

- taking a history
- conducting an examination
- confirming a diagnosis
- determining what, if any, investigations are required
- developing a management plan
- providing education and advice
- considering treatment recommendations and referral options
- reviewing progress

In many cases, recovery from WAD occurs quickly. However approximately half of all people with WAD will have symptoms beyond 12 weeks. To deal with more complex cases the pathway offers ways to take action, by:

alerting primary health care professionals to adverse prognostic indicators which may indicate the need for more intensive treatment or early referral

confirming that the diagnosis of a fracture or dislocation warrants immediate referral to an Emergency Department or a medical specialist

providing advice as to when referral to specialists or multi-disciplinary pain team or rehabilitation providers should be considered.

Target audience

The pathway is relevant for general practitioners and other health professionals involved in primary care eg, physiotherapists, chiropractors and osteopaths. It is also relevant for medical specialists and other health professionals providing secondary and tertiary care for people with WAD*. An *Evidence report* containing a detailed description of the methodology used to review the evidence and develop recommendations to inform the pathway has also been prepared.¹

* The expectation is that a collaborative model will be applied with communication between specialists and communication back to the treating general practitioner.

METHODOLOGY

A more detailed account of the methodology is provided in the *Evidence report*.¹

The methodology was guided by NHMRC recommendations for the conduct of systematic reviews and the preparation of clinical guidelines.

The current review involved a comprehensive search to identify and analyse evidence regarding the management of acute and chronic whiplash. A complete search of the literature from the start of the various databases was made in relation to both acute and chronic WAD.

The searches of appropriate electronic databases were conducted using defined eligibility criteria for each of the three key areas (assessment/diagnosis, prognosis and treatment). Bibliographies from identified papers and systematic reviews were searched recursively to identify any papers missed by the electronic search process. Papers were screened for inclusion by one or more independent reviewers and where necessary an external expert was consulted to determine if any major studies had been missed. Summary tables were constructed which outlined the details of included studies and their results.

To determine a grade of recommendation, the process recommended by the NHMRC was followed (see Appendix 3 and the NHMRC additional levels of evidence and grades for recommendations for developers of guidelines¹³). First, the level of evidence of each individual study was determined (refer Table 7, page 50). Next, the quality of each study was determined. The body of evidence assessment matrix (Table 8, page 51) was then consulted and the factors in that matrix (volume of evidence, including quality, consistency, clinical impact, generalisability and applicability) were assessed in relation to the studies bearing on a particular recommendation. Finally, a grade of recommendation (Table 9, page 52) was determined for each factor using the flowchart outlined in the NHMRC document referenced above.¹³

These recommendations were presented to a Technical Advisory Group (see Appendix 1). This group examined the findings of the review process and discussed any modifications. Recommendations were finally presented to a Steering Committee and agreed changes were incorporated into the final document. Information specific to each area reviewed is discussed briefly below.

Assessment and diagnosis

One of the difficulties in diagnosing whiplash is that the term 'whiplash' describes a mechanism of injury and not a single pathology. This mechanism of injury may, in turn, lead to a variety of clinical manifestations, the most common of which is neck pain.

In 1995 the QTF developed a classification system that was designed to improve the management of WAD by providing a guide to the signs and symptoms of whiplash indicative of the seriousness of the injury sustained (Table 1).² This system has helped guide assessment and diagnosis over the past decade.

It is important that clinicians can identify signs and symptoms indicative of various levels of severity of WAD so appropriate management can be undertaken. The accurate diagnosis of WAD IV (synonymous with fracture/dislocation) is the major focus of the diagnosis section of this clinical pathway.

The majority of studies identified in the diagnosis review looked at a particular descriptive clinical feature in a whiplash population and compared this to a normal or asymptomatic population. In the majority of these studies the test or procedure was not compared to a gold or reference standard. These studies were deemed to be exploratory or descriptive in nature and were included in the current review as background only. They were not given a grade of evidence. However, assessment of the key explanatory characteristics of whiplash may help guide treatment in both the acute and chronic stages.

Additionally, a complete assessment of WAD Levels I-III requires assessment of key prognostic indicators which will help identify high risk patients and patients in need of more regular review of treatment or earlier referral to a specialist. Prognostic features, which are important for clinicians to assess, are included in this section of the pathway.

Prognosis

A strict methodological process was followed in the prognosis review (see *Evidence report*¹). The principles of the review followed the process of Scholten–Peeters¹⁵, as this review represents a more comprehensive approach to reviewing prognosis than the MAA guidelines¹¹. The key differences in the inclusion criteria in this review compared to Scholten–Peeters¹⁵ were the inclusion of inception cohorts only (0-6 weeks) and the requirement that the study population exclusively included whiplash subjects (ie those with symptoms after a motor vehicle accident). After a rigorous search process of all relevant databases, studies were reviewed for inclusion criteria by two independent reviewers and rated for quality. A total of 67 papers, reporting on 38 separate cohorts, met the inclusion criteria.

Following this, data were extracted regarding the percentage of whiplash sufferers recovered and mean pain and disability scores over time. These data were able to be meta-analysed; recommendations regarding the clinical course of whiplash are taken from these data.

Prognostic factors associated with outcome were extracted from all 67 studies. However, where authors reported data from the same cohort over several papers, prognostic factors were extracted from the paper reporting the longest-term follow-up. Where both univariate and multivariate results were presented, results were taken from the multivariate analyses. It was not possible to statistically pool prognostic factors, therefore in order to make recommendations that would satisfy the consistency criteria of the NHMRC matrix, factors were only considered if they were measured in more than one cohort and were associated with poor outcome as defined by ongoing pain and / or disability. All factors extracted (ie, those measured in one cohort only or those associated with outcomes other than ongoing pain or disability) can be viewed in the Appendices of the *Evidence report*¹.

The recommendations in this pathway regarding factors associated with poor outcome are taken from factors that satisfied Grade A or B recommendations using the NHMRC schema ('body of evidence can be trusted to guide practice in most situations'). Evidence relating to other factors, where the evidence was less strong or was conflicting, can be viewed in the *Evidence report*.¹

Treatment

The treatment review examined electronic databases from inception until March 2007 so that all trials relating to acute and chronic treatment could be identified. As noted above, bibliographies from identified papers and systematic reviews were searched recursively to identify any papers missed by the electronic search process. Papers were screened for inclusion by one or more independent reviewers and where necessary an external expert was consulted to determine if any major studies had been missed. Randomised controlled trials were assessed for methodological quality using the PEDro

scale¹⁶. Systematic reviews were scored for methodological quality using a modified QUOROM guidelines checklist.¹⁷

Grades of recommendation for treatment were made using the NHMRC guidelines¹³ outlined above. Where evidence was lacking, decisions regarding treatment were made by consensus at the Technical Advisory Group. In general, treatments that received a Grade A or B rating were included in the pathway under the heading *Treatments that should be initially undertaken*. Treatments with a Grade C rating were included under the heading *Treatments that may be undertaken provided there is ongoing evidence of benefit*. Treatments that had evidence against their use, and treatments for which there was an absence of evidence were grouped under the heading *Treatments that should not be undertaken*.

Time periods for review

The time periods for treatment review are based on consensus, and follow the recommendations developed by the Quebec Taskforce ², which were likewise derived by consensus. There was little evidence to inform the periods of review. The timeframes outlined aim to ensure that ineffective treatment is not continued where it could possibly lead to chronicity.

THE PATHWAY

The following section outlines a pathway of care for patients presenting with a whiplash-associated disorder to any primary care practitioner. There are two pathways:

- The acute pathway is applicable to an adult patient presenting between 0 and 12 weeks post accident. The review time points of this pathway relate to time after initial presentation to the health practitioner.
- The chronic pathway is applicable both to patients presenting for the first time in the chronic phase (≥ 12 weeks post accident) and patients who initially present in the acute phase and require treatment through this phase and into the chronic phase. The review time points outlined in this pathway relate to time after presentation to the health practitioner in the chronic phase.

Both pathways include a section on the initial assessment of a whiplash patient appropriate for each phase. The development of these pathways, including the proposed review times after injury, were by consensus and aimed to ensure that ineffective treatment is not continued where it could possibly lead to chronicity. Details regarding assessment, prognosis and treatment follow after the pathway in the *Recommendations for clinical practice* section. This section also outlines the evidence base used to create the pathway. Further information regarding evidence underpinning the pathway may be seen in the *Evidence report*.¹

Figure 1 Initial assessment of a whiplash-associated disorder

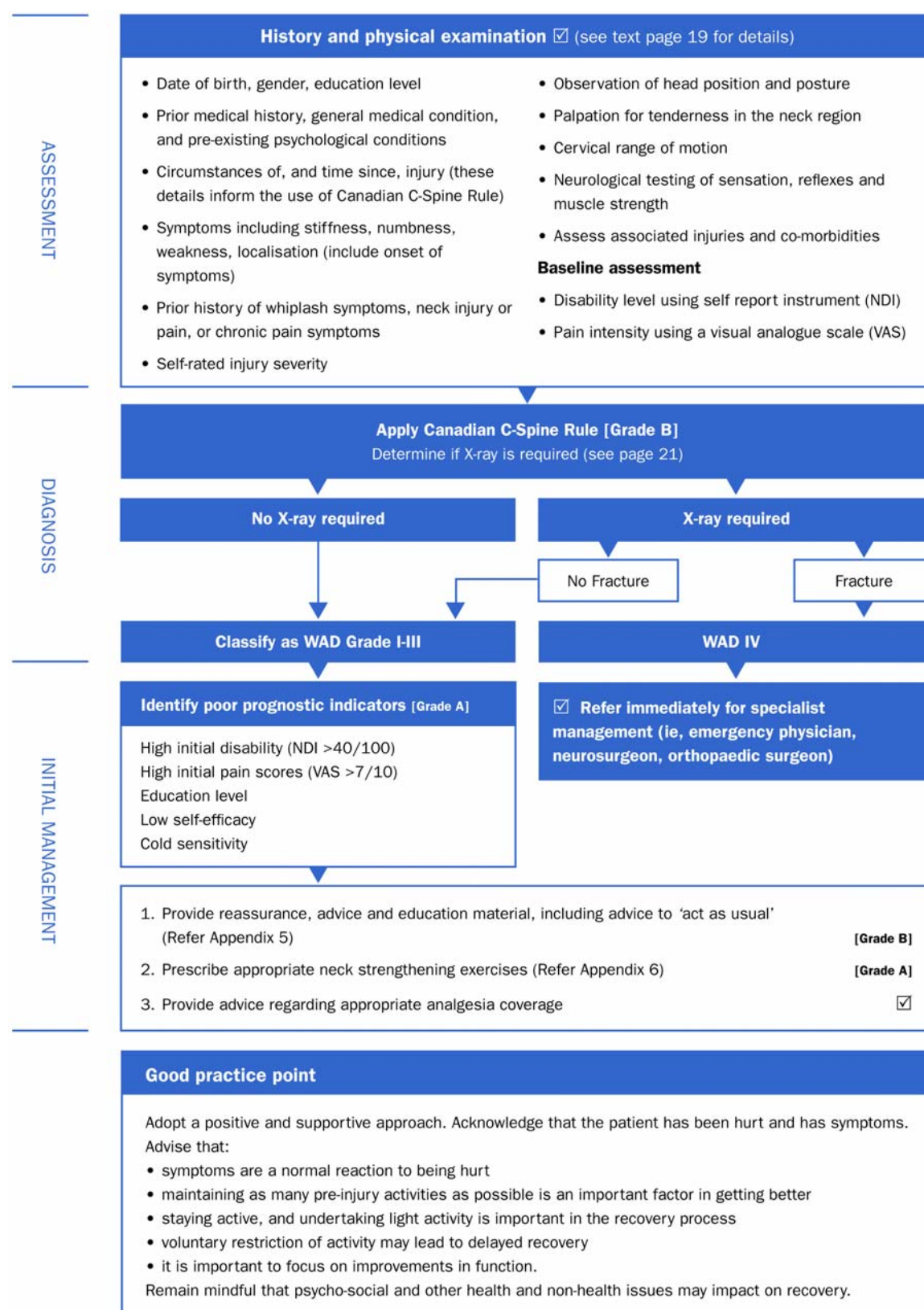
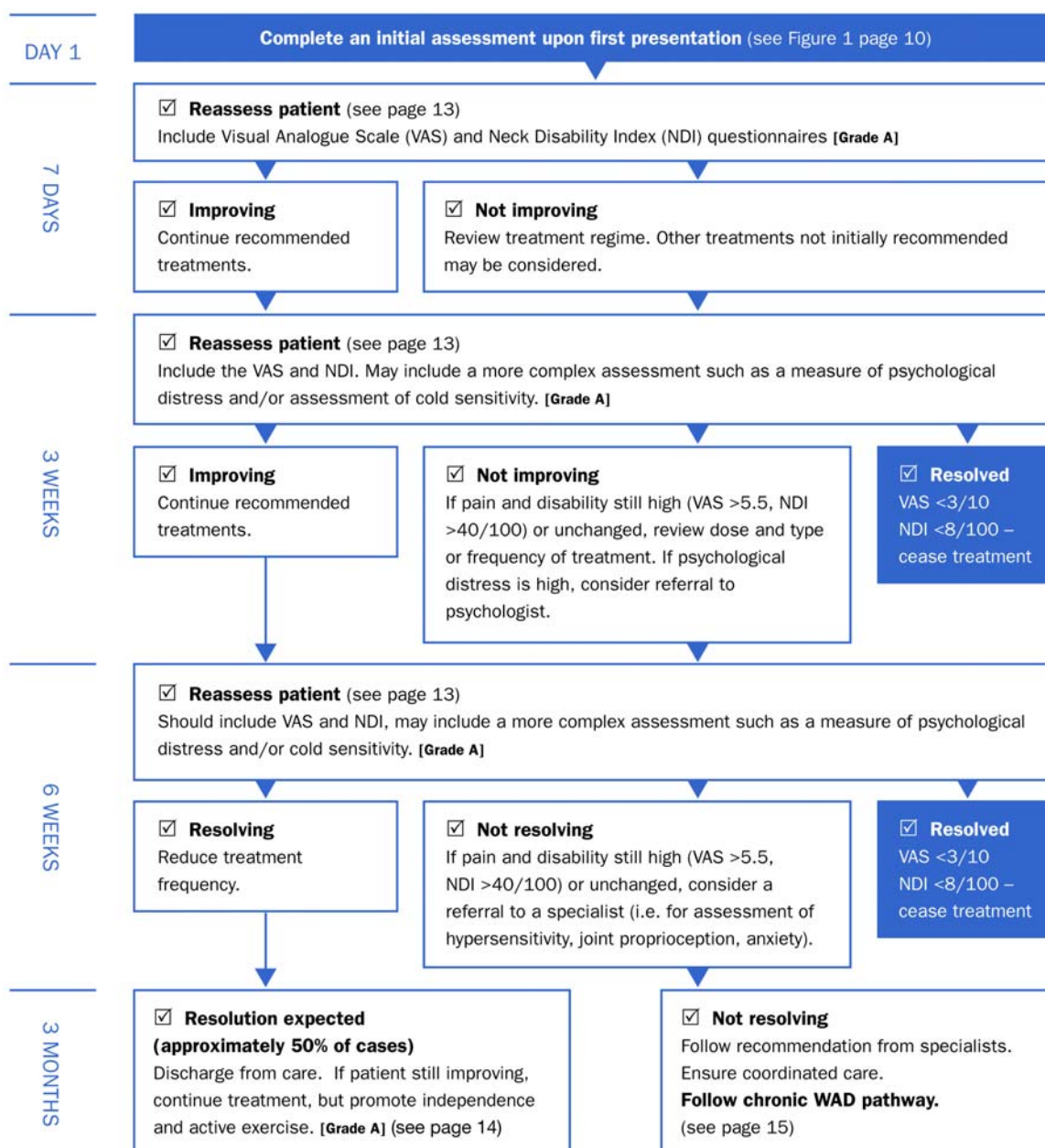


Figure 2 Acute WAD pathway – up to 12 weeks



The acute WAD pathway

The flowchart (Figure 1 and Figure 2) provides a structure for the assessment and treatment of people with WAD during the first 12 weeks following injury. (To assist with interpretation of technical terms and abbreviations, please refer to Abbreviations and Acronyms on page 75 and the Glossary on page 77). The flowchart offers a summary of how to apply the recommendations in the Guidelines. It is a guide only, as there will always be individual variations. Review dates relate to time since initial presentation (and assume that patients are receiving appropriate treatment during this time).

Initial assessment

Classify the WAD Grade according to the QTF definition and assess the need for X-ray using the Canadian C-Spine rule (see page 21). Whilst higher WAD grades according to the QTF gradings indicate greater severity, poor prognosis is most likely associated with a high pain score using the Visual Analogue Scale (VAS) (> 7/10), a high disability score using the Neck Disability Index (NDI) (>40/100) or a non-tertiary education level (defined as no education after secondary school). Copies of the VAS and NDI and how to score them accompany this guide (see Appendix 4, page 53). Education level may be assessed by asking the patient "What is the highest level of education you have achieved?" Reassessing pain and disability using the VAS and NDI at all review points (see overleaf) is recommended in order to identify WAD sufferers at risk of non-recovery.

Baseline measurement of pain, disability, functional ability and psychological factors should be undertaken to enable assessment of outcome (change in patient status) over time (improving, stable, deteriorating). Evaluation of outcome with the use of validated measures may provide clinical justification for the provision, continuation, reduction or cessation of treatment components.

Good practice point

Most people recover from the shock of an event such as a motor vehicle accident with the support of family and friends. A small minority may continue to experience high levels of acute stress, or trauma-specific psychological reactions, and this is associated with poor emotional recovery post injury.¹⁸

Where symptoms such as intrusive recollections of the event (e.g. nightmares), avoidance and emotional numbing, (e.g. avoiding reminders of the event, loss of interest in normal activities) or hyperarousal (e.g. difficulty sleeping or irritability) persist beyond one to two weeks and interfere with the patients daily activities, work or relationships, early referral to a psychologist or psychiatrist is recommended.

As the onset of posttraumatic symptoms can be delayed, the practitioner should remain mindful of the possibility that posttraumatic responses may be implicated where the patient's recovery is delayed.

For further information, the reader is directed to the *Australian Guidelines for the Treatment of Adults with Acute Stress Disorder and Posttraumatic Stress Disorder: Practitioner Guide*, located at www.acpmh.unimelb.edu.au.

Primary care practitioners should review patients at least at the intervals shown in the flowchart, namely at 7 days, 3 weeks, 6 weeks and 3 months for acute WAD. Review should include reassessment of pain and disability using the VAS and the NDI respectively. ***Improvement is considered at least a 10% change on these assessment scales.***

Seven-day reassessment

Reassess, including the Pain VAS and NDI. If these are high or unchanged, treatment type and intensity should be reviewed. Other treatments listed in this guide may be considered. The effectiveness of such treatments should be closely monitored and only continued if there is evidence of benefit (***at least 10% change on Pain VAS and NDI***).

Three-week reassessment

Reassess including the Pain VAS and NDI. If these are unchanged, a more complex assessment may need to be considered and treatment type and intensity should again be reviewed. Baseline assessment of psychological factors such as self-efficacy, catastrophising or anxiety should also be assessed where appropriate. Assessment of cold hypersensitivity may also be undertaken.

The Self-Efficacy Scale (SES) or the catastrophising subscale of the Coping Strategies Questionnaire (CSQ) (see Appendix 4, page 53) may be used as a baseline for psychological assessment. Other validated psychological scales such as the Impact of Events Scale (IES) or SF-36 can be used. The Kessler Psychological Distress Scale (K10) is another psychological scale that can be used. (Whilst the K10 has not been validated with whiplash, it has been included by consensus as it is frequently used by GPs in South Australia for assessment of psychological state).

Six-week reassessment

Reassess again at this point. In at least 45% of cases resolution should have occurred or be occurring, and the process of reducing treatment in resolving cases should commence or continue. If resolution is not occurring (i.e. Pain VAS and NDI scores remain high – Pain VAS >5.5 and NDI >40/100) or if the Pain VAS and NDI have not changed by at least 10% from the last review, consider referral to a medical specialist or allied health practitioner.

Amongst other things, if the Pain VAS and NDI are unchanged, the specialist should undertake a more complex physical and/or psychological examination (such as assessment of hypersensitivity, joint proprioception, anxiety or post-traumatic stress). They should direct more appropriate care and liaise with the treating practitioner to ensure this. Practitioners should consider referral to a clinical psychologist, for example for cognitive behavioural therapy or trauma-focussed psychological therapy, if the psychological assessment data are markedly outside norms. If the symptoms are resolving treatment should be reduced.

Good practice point

Identifying psychological and socio-occupational factors ('yellow flags') early in the course of rehabilitation is of particular importance, as these are potentially modifiable with early intervention.

Remain mindful that the following issues may flag the need for early referral to a specialist. Strategies to address these factors need to be considered in the management plan:

- Attitudes and beliefs about pain
- Emotional Response
- Behaviours
- Family
- Work
- Compensation issues
- Diagnostic and treatment issues

Source: *Evidence-based Management of Acute Musculoskeletal Pain: A Guide for Clinicians* (2004) Australian Acute Musculoskeletal Pain Guidelines Group.

Three-month reassessment

Resolution should have occurred in approximately 50% of acute cases. In these cases treatment should have ceased. If the patient is still improving, continue treatment, but independence should be promoted (eg, focus on active exercise). In these resolving cases, the patient should be reviewed intermittently (suggested three monthly) over the next 6-12 months until resolution, to ensure home programs are maintaining improvement.

Patients who still require treatment after three months then move into the chronic phase of the pathway (see Figure 3 and Figure 4).

Figure 3 Initial or re-assessment of chronic WAD >12 weeks post MVA

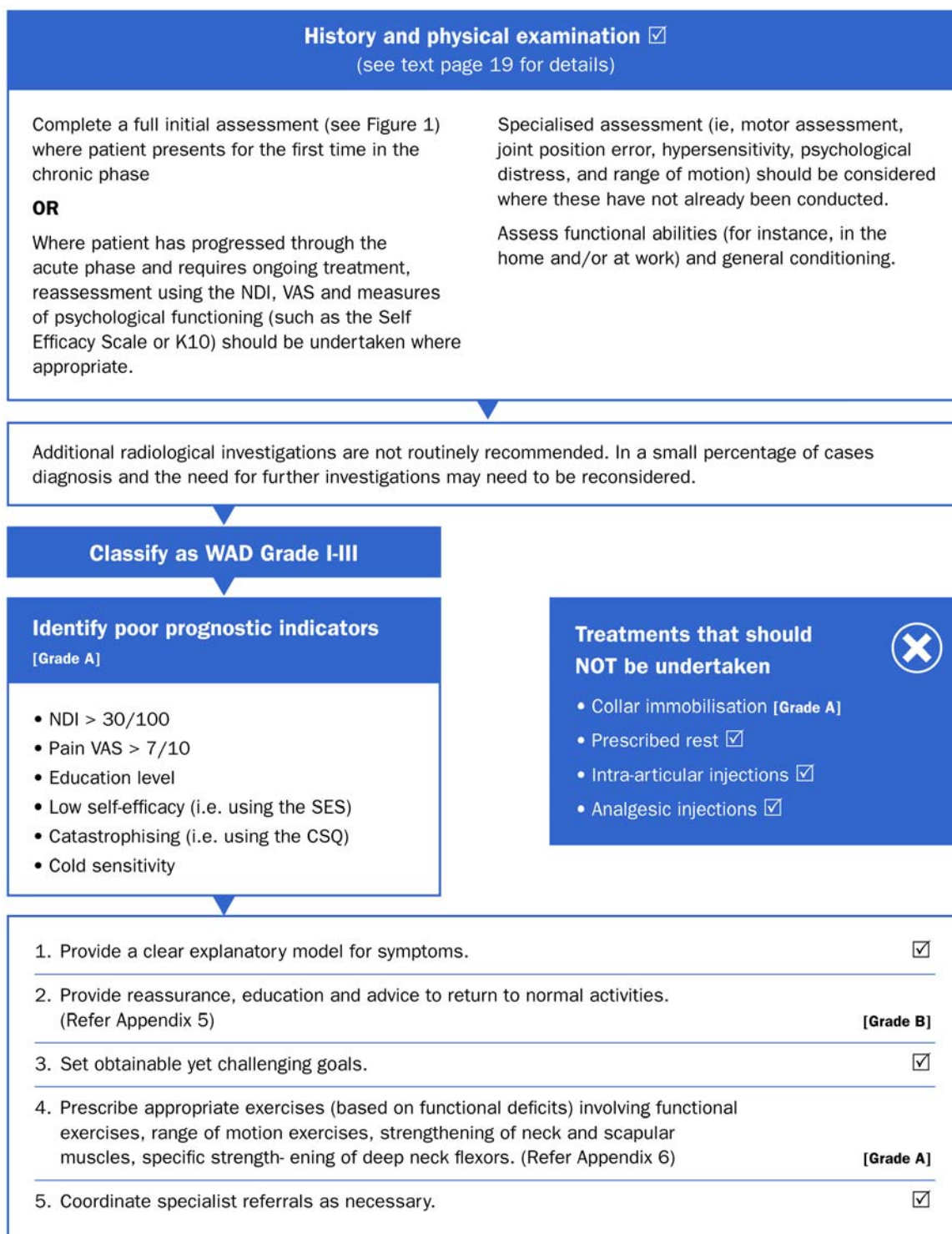
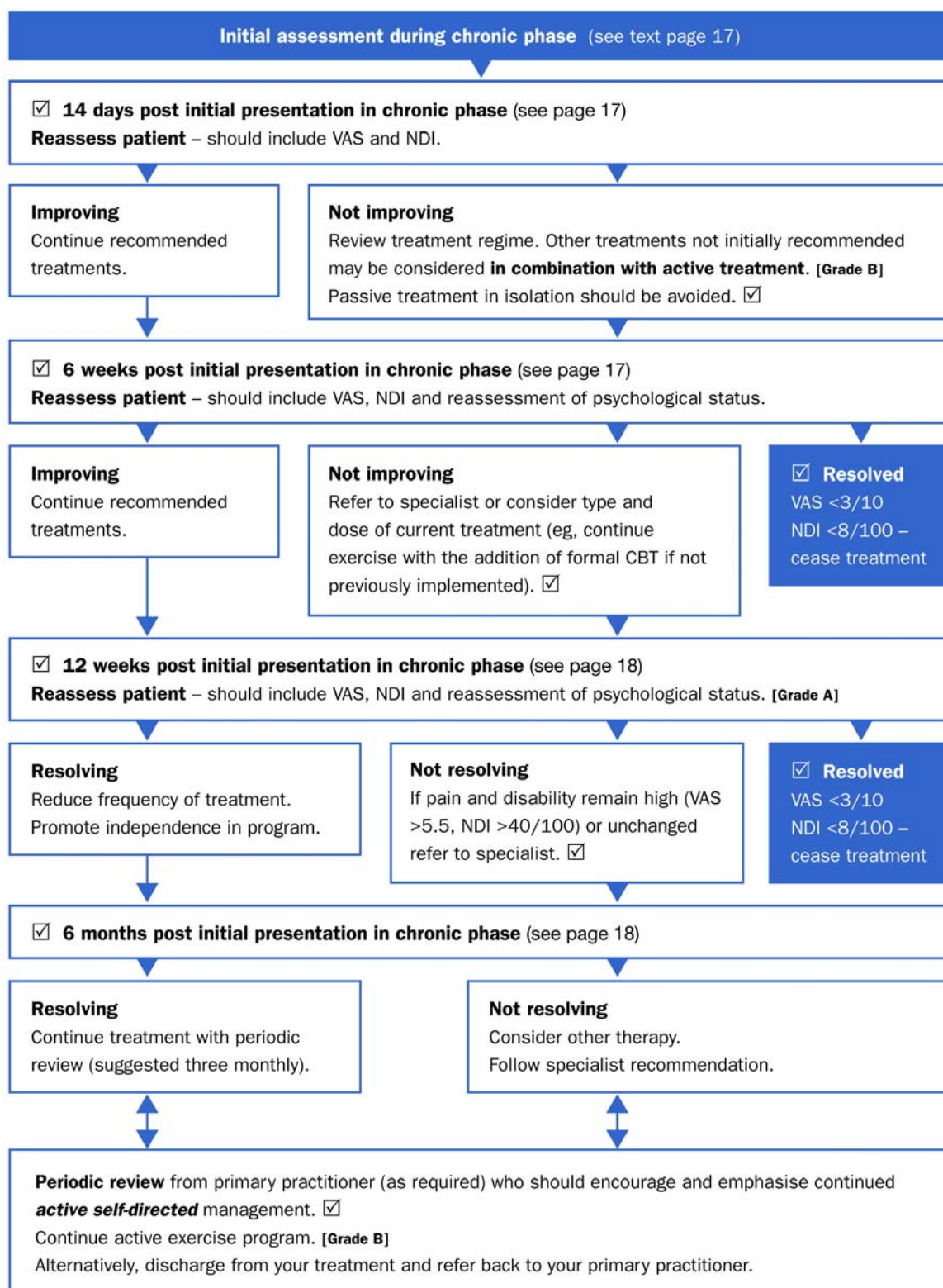


Figure 4 Chronic WAD pathway > 12 weeks post MVA



The chronic WAD pathway

The flowchart (Figure 3 and Figure 4) provides a structure for the assessment and treatment of people with WAD after 12 weeks post injury. Review dates relate to time since presentation in the chronic phase (and assume that patients are receiving appropriate treatment during this time). Review dates were developed on the basis of consensus, and reflect the work of the Quebec Taskforce ².

Initial or re-assessment

Initial assessment is appropriate for patients presenting to a practitioner for the first time in the chronic phase. Patients who have progressed through the acute phase and require ongoing treatment should be reassessed using the NDI, pain VAS and measures of psychological functioning (SES and CSQ) as appropriate.

Patients in the chronic phase should be considered for specialised assessment (in addition to standard assessment) such as motor assessment, assessment of joint position error, hypersensitivity and assessment of psychological distress, (using tools such as the IES). Additional diagnostic imaging is **not** routinely recommended at this stage. In a small percentage of cases the diagnosis may need to be reconsidered and additional investigations undertaken.

It remains important to classify the grade of WAD, as WAD III patients (with neurological involvement) may require different treatment (such as avoidance of manipulation) or care with application of techniques and may have a different prognosis from those with WAD I and II.

Primary care practitioners should review patients at least at the intervals shown in the flowchart, namely at 14 days, 6 weeks, 12 weeks and 6 months post initial presentation for chronic WAD. Review (as a minimum) should include reassessment of the Pain VAS and the NDI. ***Improvement is considered at least a 10% change on these scales (since previous review).***

Fourteen-day reassessment

Reassess, including the Pain VAS, NDI and psychological status (SES or CSQ). If these are high or unchanged, treatment type and intensity should be reviewed. Other treatments listed in this guide (such as joint mobilisation) may be considered ***in combination with active treatment (passive treatment in isolation should be avoided)***. The effectiveness of such treatments should be closely monitored and only continued if there is evidence of benefit (***at least 10% change on Pain VAS and NDI***).

Six-week reassessment

Reassess, including the Pain VAS, NDI and psychological status (SES or CSQ). If these are unchanged, a more complex assessment may need to be considered and treatment type and intensity should again be reviewed. ***Introduction of formal cognitive behavioural therapy is appropriate at this stage if not already started.*** If the Pain VAS, NDI and measures of psychological status are unchanged, consider referral to a medical or allied health practitioner specialising in chronic pain management (if not already undertaken). Ensure coordinated care if multidisciplinary treatment is being undertaken.

Amongst other things, if the pain VAS and NDI are unchanged, the specialist should undertake a more complex physical and/or psychological examination (such as assessment of hypersensitivity, joint proprioception, anxiety or post-traumatic stress). They should direct more appropriate care and liaise with the treating practitioner to ensure this. If the symptoms are resolving treatment should be reduced.

Twelve-week reassessment

Reassess again at this point. If resolution is not occurring and the Pain VAS and NDI have not changed by at least 10% from the last review (or have at this point a Pain VAS score of >5.5 or NDI score of >40/100), specialist care should still be followed, or refer to a specialist if this has not already been done. A further review of treatment intensity and compliance with treatment should be undertaken.

Six-month reassessment

Resolution should have occurred in up to 65% of cases 12 months post accident. In these cases treatment should have ceased. At this point, even if resolution has not occurred and provided 6 months of appropriate treatment has been undertaken, treatment should be reduced. Patients at this stage should receive periodic (suggested 3 monthly) review from their primary practitioner.

Practitioners should encourage patients to continue an **active exercise** program and should emphasise **self-directed active management** strategies. Alternatively, discharge from your treatment and refer back to primary practitioner. When there is no demonstrable evidence of benefit*, consider appropriate referral to another relevant practitioner.

Health professionals may also wish to consider a 'measured therapy break' (a trial of no treatment) to determine whether ongoing treatment is clinically justified. The reader is directed to the Victorian Transport Accident Commission (TAC) website <http://www.tac.vic.gov.au>, or the TREAT website hosted by the Workcover Corporation of South Australia <http://www.workcover.com/TREAT/TREATHome.aspx>, for further resources regarding clinical justification.

* Evidence of benefit refers to at least a 10% reduction on measures of pain (VAS) and disability (NDI).

RECOMMENDATIONS FOR CLINICAL PRACTICE

Recommendations for clinical practice are presented for assessment, prognosis and treatment of WAD.

Evidence located by the literature review is summarised and the level of evidence provided by this research is rated. Rating scales used to determine the grade of evidence for recommendations are described in Appendix 3. The *Evidence report*¹ provides further details of these studies and a complete bibliography.

Recommendations for assessment and diagnosis

When making an assessment of a person with whiplash it is important to use appropriate tests to diagnose or classify the condition correctly. Additionally, clinicians need to gather information regarding prognostic factors and any additional information that will help guide treatment and provide a baseline determination of health status, which will help to determine the effectiveness of any ongoing treatment.

History taking

History taking is important during all visits for the treatment of WAD patients of all grades. The history should include information about:

- Date of birth, gender and education level (assessed by asking “What is the highest level of education you have achieved?”)
- Circumstances of injury, such as relevant crash factors, which are related to the Canadian C-Spine rule (see page 21)
- Time since injury (to determine chronicity and appropriate treatment as per the pathway)
- Symptoms, particularly including pain intensity (ideally, using a visual analogue pain scale (VAS)¹⁹, numerical rating pain scale (NRS) or similar – see Appendix 4, page 53). Stiffness, numbness, weakness and associated extra-cervical symptoms. Number of symptoms, localisation, time of onset and profile of onset should also be recorded for all symptoms. Self-rated injury severity should also be measured. Clinicians should assess patients’ belief systems where appropriate.
- Disability level, preferably using the Neck Disability Index (NDI)²⁰.
- Other scales such as the Functional Rating Index²¹, Patient-Specific Functional Scale²², Core Whiplash Outcome Measure²³, or similar may also be used (see Appendix 4, page 53). Such an assessment should be completed at the initial visit.
- Prior history of neck problems including previous whiplash injury.

Where appropriate, further assessment to determine psychological status may be undertaken at 3 or 6-week review. The preferred tools are the Self-Efficacy Scale (SES)²⁴ and the Coping Strategies Questionnaire (CSQ)²⁵ which are both validated tools. Other scales such as the Impact of Events Scale²⁶, or Kessler Psychological Distress Scale (K10)²⁷ may be useful in some circumstances (see *Evidence report*¹ for details).

History details should be recorded. A standard form may be used.

Physical examination

A focused physical examination is necessary for all patient visits. Results of the physical examination should be recorded and should include:

- Observation (particularly of head position / posture)
- Palpation for tender points
- Assessment of cervical range of motion (ROM) including flexion (chin to chest), extension, rotation and lateral flexion. Tools, such as a universal goniometer or inclinometer, can be used to measure neck range of motion (ROM), and may be more reliable than observation
- Neurological testing of sensation, reflexes and muscle strength (where appropriate). Neurological testing is appropriate when the patient complains of pins and needles, numbness and/ or weakness into the extremities
- Assessment of associated injuries and co-morbidities
- Assessment of general medical condition including psychological state (as appropriate)

A further, more specialised, physical examination assessment (particularly with regard to chronic whiplash) might include:

- Assessment of joint position error (cervical proprioception)
- Assessment of cervical flexor muscle control
- An assessment of widespread sensory hypersensitivity (which should include cold sensitivity)
- A standard form may be used to record results of the assessment.

Following assessment, patients should be classified as a Grade I, II, III or IV according to the QTF Classification of Grades. (It remains important to classify the grade of WAD, as WAD III patients (with neurological involvement) may require different treatment (such as avoidance of manipulation) or care with application of techniques and may have a different prognosis from those with WAD I and II). Patients with potentially poor prognosis (ie, high Pain VAS scores (pain $\geq 7/10$) and high NDI scores (disability score $> 40/100$)) should be noted.

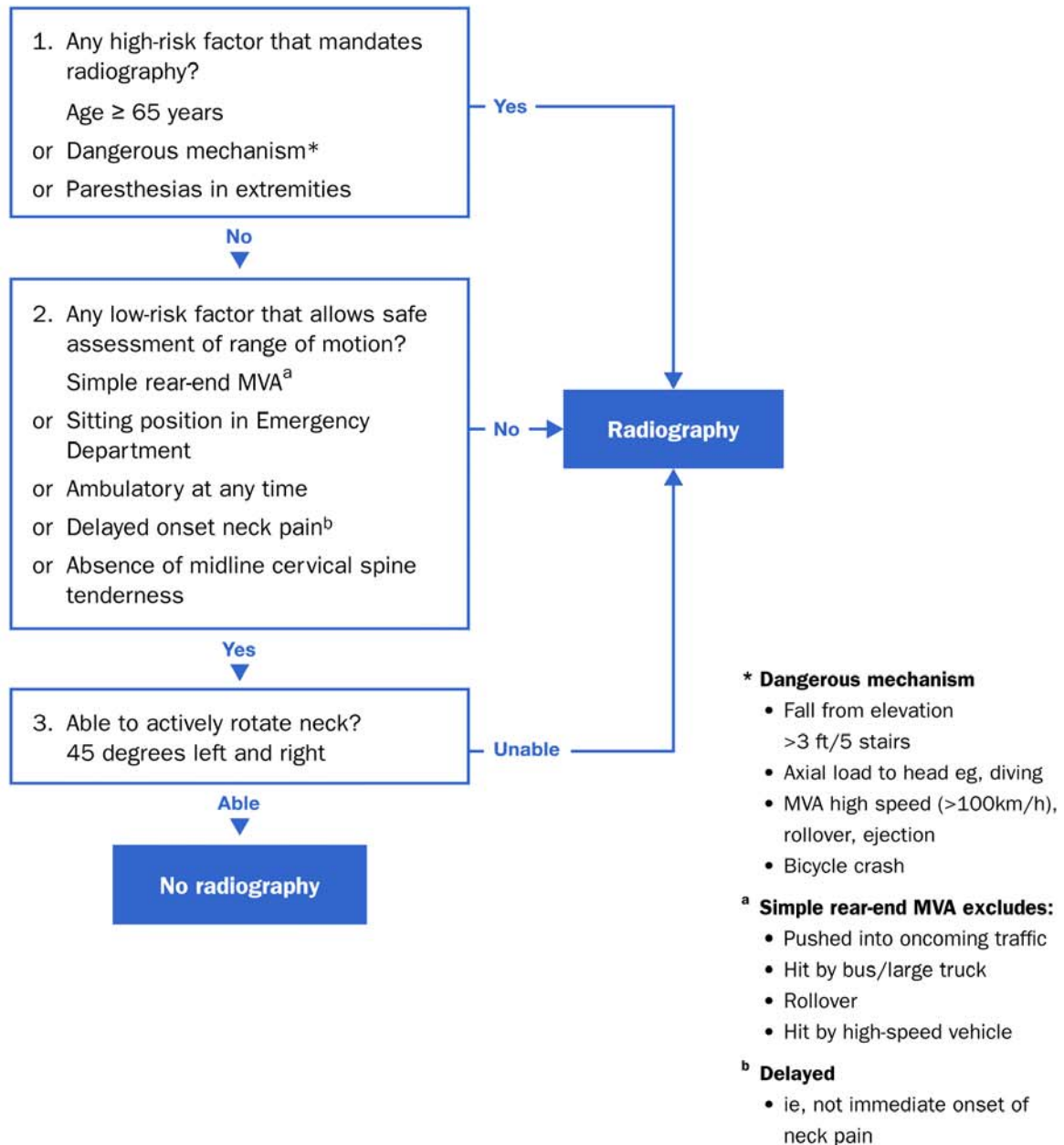
Plain radiographs

The Canadian C-Spine rule²⁸ (Figure 5, overleaf) should be used to decide whether x-ray of the cervical spine is required for diagnosis of fracture / dislocation. This rule has been validated and has been shown to have a sensitivity of 100% and specificity of 42.5%. Essentially physicians who follow this rule can be assured that a fracture will not be missed (95% confidence interval 98 to 100%).

Figure 5 The Canadian C-Spine Rule

The Canadian C-Spine Rule

For alert (GCS score = 15) and stable trauma patients when cervical spine injury is a concern



Instructions for using the Canadian C-Spine Rule

1. Define whether there is a high-risk factor present (age ≥ 65 years), a dangerous mechanism (includes high speed or roll over or ejection, motorised recreation vehicle or bicycle crash). If this is the case an X-ray of the cervical spine should be performed.
2. Define low-risk factors that allow safe assessment of neck range of motion (ROM). If the low-risk factors in the figure are not present, an X-ray of the neck should be performed.
3. Assess rotation of the neck to 45 degrees in people who have low-risk factors. If people are able to rotate to 45 degrees they do not require an X-ray of the neck.

Specialised imaging techniques

WAD Grades I and II

There is no role for specialised imaging techniques (eg X-ray tomography, CT, MRI, myelography, discography etc.) in WAD Grades I and II.

WAD Grade III

Specialised imaging techniques might be used in selected WAD Grade III patients, e.g. nerve root compression or suspected spinal cord injury, on the advice of a medical or surgical specialist.

Specialised examinations

Examples of such examinations include EEG, EMG and specialised peripheral neurological tests.

WAD Grades I and II

There is no role for specialised examination techniques (eg EEG, EMG and specialised peripheral neurological tests) in case of WAD Grade I or II.

WAD Grade III

Specialised examinations may be used in selected WAD Grade III patients, eg those with nerve root compression or suspected spinal cord injury, on the advice of a medical or surgical specialist.

Summary of evidence relating to assessment and diagnosis

The most important element of initial assessment and diagnosis of WAD is the identification of patients who are at risk of developing, or who have developed, serious consequences (such as fractures or dislocations) following a motor vehicle accident, so that these issues can be treated appropriately. There is Grade B evidence (2/2 High Quality (HQ) studies^{28,29}) indicating that the Canadian C-Spine rule (Figure 5) is the most appropriate rule to apply in order to correctly diagnose a fracture or dislocation without the necessity of X-raying every person with WAD. This rule has been validated in emergency department populations and has been shown to be better than unstructured clinical judgement in detecting WAD IV patients. The high reported sensitivity of this test (100%²⁸) is such that clinicians who follow this rule are extremely unlikely to miss a fracture.

Recommendations for history taking and physical examination are primarily based on the Quebec Taskforce guidelines.² The QTF recommendations were based on the consensus opinion of the QTF. No accepted studies were found by the QTF, which dealt with the value of history taking or physical examination for the positive diagnosis of WAD.

The results of the evidence review highlight the fact that clinical signs and symptoms following whiplash are diverse. Both acute and chronic WAD are characterised by reduced range of motion of the neck. There is an increasing body of evidence that chronic whiplash is characterised by disturbances in motor function, altered joint proprioception, generalised sensory hypersensitivity and psychological distress. Assessment of these factors may assist clinicians in classifying chronic whiplash patients and determining the type of treatment that is recommended in the future.

The picture with acute whiplash is less clear. Whilst a loss of range of motion (in all planes) is a consistent finding, there is less evidence to support other findings such as altered muscle recruitment or sensory hypersensitivity. The physical examination techniques recommended in this pathway include items that will assist grading of WAD patients but also take into account the common features of WAD.

Findings of a number of cohort studies identified in the review of prognosis are relevant to both history and physical examination. The results of the prognosis review may be seen in the *Evidence report*.¹

The main findings of the prognosis review indicate that high initial pain levels and high initial disability levels are associated with a poor prognosis [Grade A]. These factors therefore need to be assessed by clinicians. The VAS pain scale and the Neck Disability Index are simple, valid, reliable and responsive tools to measure pain intensity and disability status respectively. The use of these tools in the assessment of WAD patients is therefore routinely recommended.

Despite recent improvements in the diagnostic ability of MRI and CT imaging, until there is a clear correlation between findings using these imaging techniques and the prognosis of individual patients with benefits in terms of treatment, the use of such techniques (or indeed other specialised techniques) cannot be routinely recommended for WAD Grade I and II. There is a place for such imaging in selected WAD III patients where there is nerve root compression or suspected spinal cord injury. This should be done on the advice of a medical specialist.

Recommendations for prognosis

Course of recovery after whiplash

The best estimate of the course of recovery after whiplash is outlined in Table 2, below (see *Evidence report*¹ for details).

Table 2 Course of recovery after whiplash

Time after injury	% Recovered*	Pain Mean: scale 0-100† (95%CI)	Disability Mean: scale 0-100‡ (95%CI)
1 month	44%	38.0 (21.8-54.1)	28.6 (20.4-36.7)
12 months	65%	25.3 (11.7-39.0)	19.0 (13.0-25.0)
2 years	No data available	21.5 (3.4-39.6)	15.6
5 years	75%	No data available	No data available

*Recovery defined by individual studies (absence or minimal pain and/or disability)

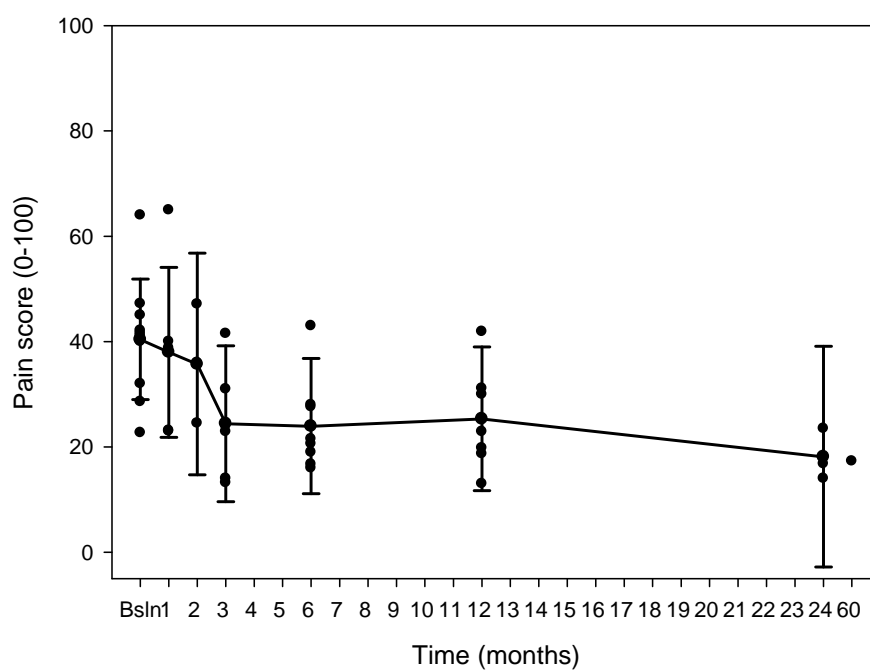
†Where 0 is no pain and 100 is worst pain imaginable

‡Where 0 is no disability and 100 is total disability

Whilst these figures represent the best summary estimates from the data gathered in the *Evidence report*¹, the actual reported recovery rate from individual studies varies greatly due to the differences in outcomes measured and differences between cohorts. For example, estimates for recovery in the short term (ie, recovery at approximately 1 month) vary from 33% to 96% in individual studies.

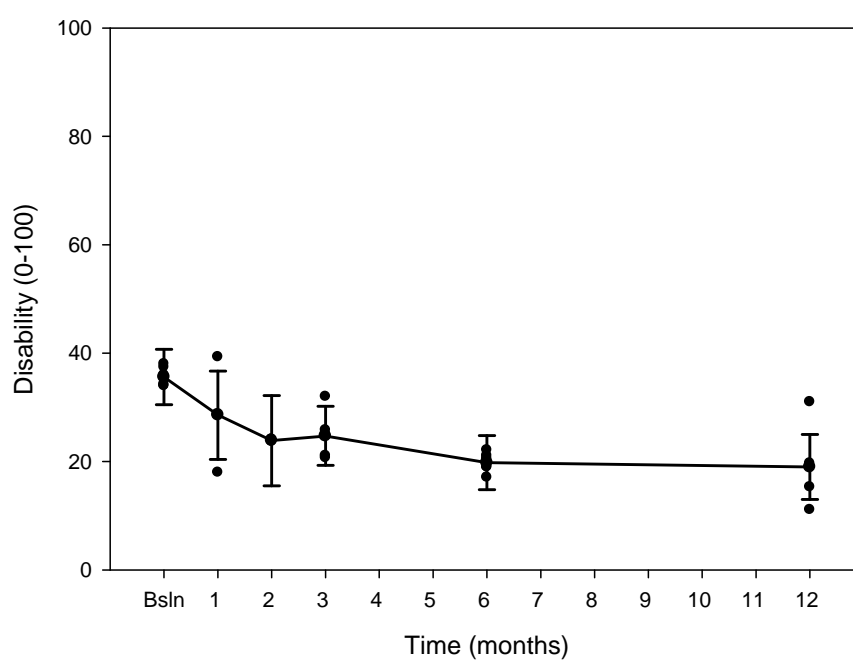
The summary data may be used by users of this pathway to determine whether their whiplash patients are recovering within a reasonable time and by a reasonable amount. For example, the pooled mean pain score on a 0-100 scale is 38.0 / 100 at 1 month, with a 95% confidence interval of 21.8 to 54.1. Therefore, patients whose pain scores are above 54/100 or 5/10 at 1 month could be interpreted as at higher risk of non-recovery.

The pooled mean pain scores over time, based on the VAS pain scale, are shown in Figure 6, overleaf. Users of this pathway are encouraged to plot their whiplash patients' progress against this pain recovery pathway to determine whether their patients are recovering or not.

Figure 6 Pooled mean pain scores (VAS) over time

Error bars represent 95% CI

Alternatively users of the pathway could plot their patients' progress against the disability course (Figure 7) to determine recovery.

Figure 7 Pooled mean disability scores (NDI) over time

Summary of prognostic indicators

Factors associated with poor prognosis

Table 3, below, shows the factors most strongly associated with poorer prognosis (defined as ongoing pain and / or ongoing disability) for subjects classified as WAD Grade I-III. These factors fulfilled the NHMRC criteria of Grade A or B recommendations, and therefore can be trusted to guide clinical practice (See *Evidence report*¹ for further details).

Table 3 Factors associated with poorer prognosis

Grade	Associated with ongoing pain	Associated with ongoing disability
A	High initial pain intensity Low self efficacy	High initial pain intensity High initial disability Catastrophising Education level Cold sensitivity
B	Large number of symptoms Self-rated injury severity Anxiety	Reduced cervical ROM

Factors not associated with prognosis

Equally, the factors below are most strongly **not** associated with a poorer prognosis. These factors also satisfy the NHMRC criteria of Grade A or B recommendations and may be trusted to guide clinical practice. Table 4, overleaf, summarizes factors not associated with poor outcome after whiplash.

Table 4 Factors not associated with poorer prognosis

Grade	NOT associated with ongoing pain	NOT associated with ongoing disability
A	Flattened cervical lordosis on X-ray Dissatisfaction at work Diverting attention Increased behavioural activity Poor mental health (SF36) Poor physical health (SF36) Direction of impact Presence of head rest Speed of impact Wearing a seatbelt	Poor physical Health (SF36) Poor social Function (GHQ) Direction of impact Presence of headrest Speed of impact Seating position in car Vehicle drivable Awareness of collision
B	Degenerative changes on X-ray Avoidance Depression Older age (up to 75 years) Awareness of collision Reduced ROM Previous neck pain	Older age (> 75 years) Wearing a seatbelt Gender

Self-reported symptoms

Poor outcomes following whiplash are associated with high initial self-reported pain intensity (eg, Pain > 7/10 on VAS scale); and disability (eg, NDI > 40/100). These factors should be measured at the initial visit and reassessed at the appropriate review points (see Figure 1 to Figure 4). The presence of either of these two factors should alert the practitioner to the potential need for more regular review of treatment or earlier referral to a specialist.

Summary of evidence regarding self reported symptoms

There is Grade A evidence (9/10 cohorts, 4 High Quality (HQ)³⁰⁻³³ and 5 Moderate Quality (MQ)³⁴⁻³⁸) that higher initial pain intensity is associated with ongoing pain symptoms after whiplash, and Grade A evidence (4/4 cohorts 2HQ^{31,39}, 2MQ^{40,41}) that high initial pain intensity is associated with ongoing disability after whiplash. There is Grade A evidence (2/2 cohorts, both MQ^{42,43}) that high initial disability is associated with ongoing disability after whiplash.

There is Grade B evidence (3/4 cohorts, 3HQ^{30,32,44}) that a large number of initial symptoms is associated with ongoing pain symptoms after whiplash, and Grade B evidence (2/3 cohorts, both HQ^{31,44}) that self rated injury severity may be associated with ongoing pain symptoms after whiplash.

Radiological findings

No radiological findings (such as degenerative changes or a flattened cervical lordosis) have been shown to be associated with poor outcome for subjects classified as WAD Grade I - III. Radiological findings should therefore not be used to determine prognosis after whiplash.

Summary of evidence regarding radiological factors

There is Grade A evidence (3/3 cohorts, all MQ^{32,45,46}) that flattened cervical lordosis is not associated with ongoing pain symptoms. There is Grade B evidence (2/3 cohorts, both MQ^{45,46}) that there is no association between degenerative changes and ongoing pain.

Psychological factors

Measures of psychological factors such as low self-efficacy and catastrophising are strongly associated with poorer prognosis, and anxiety may also be associated with poor prognosis. Measuring aspects of a patient's beliefs (i.e., self-efficacy or catastrophising) is recommended as part of the assessment of the psychological status of people with whiplash.

A patient's self-efficacy is their confidence in their ability to perform certain activities. This can be measured using the self-efficacy scale (SES) (0-200 points)⁴⁷. Lower scores were shown by both Kyhlback *et al.*⁴⁸ and Soderlund & Lindberg³⁸ to be associated with ongoing pain after whiplash.

Catastrophising in this context refers to negative self statements and catastrophising thoughts, as defined on the Coping Strategies Questionnaire catastrophising subscale (CSQ-CAT).²⁵ There are seven scales on the CSQ, each scale consisting of 6 items. A sample item on the catastrophising subscale is:

"I worry all the time about whether it will end"

This is scored on a 7 point scale: 0 = never, 3 = sometimes, 6 = always.

Higher scores on the catastrophising subscale was found to be associated with ongoing disability by Kivioja *et al.*⁴⁹ and Soderlund *et al.*⁵⁰. For example, Soderlund *et al.*⁵⁰ found that the Mean (SD) of the CSQ-CAT at initial assessment for non-symptomatic patients was 4.6 (4.1) compared with 7.7 (8.3) for symptomatic patients.

Psychological factors such as diverting attention, increased behavioral activity, poor mental health (SF36) and poor social function (SF36) are **not** associated with poor prognosis after whiplash.

Summary of evidence regarding psychological factors

There is Grade A evidence (2/2 MQ cohorts^{38,48}) that low self efficacy is associated with ongoing pain after whiplash. There is Grade A evidence (2/2 MQ cohorts^{38,40}) that catastrophising is associated with ongoing disability after whiplash. There is Grade B evidence (3/4 cohorts^{30,32,37}) that anxiety is associated with ongoing pain after whiplash.

There is Grade A evidence that dissatisfaction at work^{32,44}, diverting attention (CSQ)^{38,51}, increased behavioural activity (CSQ)^{38,52} poor mental health (SF36)^{37,53}, poor physical health (SF36)⁴³ and poor social functioning (GHQ)^{37,43,53,54} are **not** associated with poor outcome after whiplash. Each of these constructs was measured in 2 cohorts, with neither cohort finding an association.

There is Grade B evidence that avoidance and depression are **not** associated with poor outcome after whiplash.^{36,55 30,37,56,57}

Socio-demographic factors

There is Grade A evidence that poor outcome (in terms of ongoing disability) is associated with educational level (2/2 HQ cohorts^{31,58}). For example, people without a university education were twice as likely to have ongoing disability at 16 months than those with a university education.⁵⁸ Similarly, Berglund *et al.*³¹ found that those with a lower education level (primary/ low secondary) were also nearly twice as likely not to recover at 12 months than those who were more highly educated (college/ university). Obtaining information about an individual's education level is therefore recommended as part of the assessment of whiplash.

There is strong evidence that poor prognosis is **not** associated with age (at least to 75 years) or gender.

Summary of evidence regarding socio-demographic factors

There is Grade A evidence that a lower education level is associated with ongoing disability after whiplash (2/2 HQ cohorts^{31,58}).

There is Grade B evidence that older age (up to 75 years) is **not** associated with ongoing pain symptoms after whiplash (1/7 cohorts, 1HQ³¹) or ongoing disability (2/9 cohorts, both HQ^{31,53}).

Crash-related factors

There is strong evidence that poor outcome (in terms of ongoing pain or disability) is not associated with crash-related factors such as speed of impact, direction of impact, presence of a head rest, or awareness of the collision. Crash related factors should therefore not be used to determine prognosis after whiplash.

Summary of evidence regarding crash related factors

There is Grade A evidence that the direction of impact, presence of a headrest, speed of impact, seating position in the car, whether the vehicle was driveable and awareness of the collision is not associated with poor outcome after whiplash. All of these factors have been measured in at least 2 cohorts and some as many as 7 cohorts, with no cohorts finding an association between these factors and ongoing pain or disability.^{31,32,35,39,45,46,49,51,53,59-63}

Physical impairment factors

Increased sensitivity to cold, and reduced cervical range of motion are associated with ongoing disability after whiplash.

Summary of evidence regarding physical impairment factors

There is Grade A evidence that cold sensitivity is associated with ongoing disability after whiplash, based on 2/2 cohorts^{41,43} finding an association between cold sensitivity and ongoing disability.

There is Grade B evidence that reduced cervical range of motion is associated with ongoing disability after whiplash based on 2/2 cohorts.^{64,65}

Prior history/previous symptoms

There is evidence that previous neck pain is **not** associated with ongoing pain after whiplash.

Summary of evidence regarding prior history / previous symptoms

There is conflicting evidence regarding prior history / previous symptoms. However, there is Grade B evidence^{30,35,39,44-46,51} that a history of previous neck pain appears not to be associated with ongoing pain symptoms after whiplash based on the fact that only one⁵² of eight cohorts (1/8) showed an association.

Compensation factors

The relevance of compensation factors in predicting outcome in whiplash is conflicting.

Summary of evidence regarding compensation factors

There is conflicting evidence regarding whether pursuing compensation and/or consulting a lawyer is associated with ongoing pain after whiplash. Three cohorts^{30,53,66} show no association whereas one medium quality cohort⁶⁷ did show an association.

There is conflicting evidence regarding whether pursuing compensation and/or consulting a lawyer is associated with ongoing disability. One South Australian cohort⁵³ found an association whereas two cohorts^{30,64} did not.

Recommendations for treatment

Treatment recommendations for acute WAD

Table 5, below, summarises evidence and consensus based recommendations for the treatment of acute whiplash. These recommendations and the evidence associated with them are discussed in detail in the following section.

Table 5 Treatment recommendations for acute whiplash

Acute whiplash (0-12 weeks) treatment recommendations	Grade of Evidence
Treatments that should be routinely provided <ul style="list-style-type: none"> Active exercise (involving range of movement and mobilising exercises, and strengthening of the neck and scapular muscles) Advice to 'act as usual' / reassurance / education 	Grade A Grade B
Treatments that may be undertaken provided there is ongoing evidence of benefit <ul style="list-style-type: none"> Passive joint mobilisation / manipulation Heat, ice and massage Electrotherapies, including TENS, pulsed electromagnetic therapy, electrical stimulation, ultrasound and shortwave diathermy) Pharmacology – simple analgesics and NSAID's Multimodal therapy (multimodal therapy utilises a range of individual treatment modalities such as joint mobilisation, relaxation techniques, electrotherapies, and exercises, as part of a package to address individual patient deficits such as pain, loss of range of movement, and loss of strength) 	Grade C <input checked="" type="checkbox"/> Grade C Grade B Grade C
Treatments that should not be undertaken <ul style="list-style-type: none"> Collar immobilisation and/or prescribed rest Surgery, except in WAD IV Cervical pillows Intrathecal and intra-articular injections Pharmacology – intravenous methylprednisolone (please refer page 35 regarding this recommendation) 	Grade A <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>

Treatments that should be routinely undertaken

Active exercise

Range of movement (ROM), mobilising and muscle re-education / strengthening exercises for the neck and scapular muscles should be implemented immediately, if necessary in combination with intermittent rest when pain is severe. Clinical judgement is crucial if symptoms are aggravated by exercise. The aim of muscle re-education / strengthening is to restore appropriate muscle control and support to the cervical region. A number of suitable exercises are listed in Appendix 6 (page 71).

Summary of evidence regarding active exercise

There is Grade A evidence (6/6 studies⁶⁸⁻⁷³) supporting a regime of active exercises over collar immobilisation and advice to rest. A common theme of active exercises is strengthening of the neck and scapular muscles, range of movement exercises and mobilising exercises. As noted above, a number of suitable exercises are described in Appendix 6 (page 71). Bunketorp *et al.*⁷⁴ demonstrated that supervised physical training involving individualised range of motion, stability, proprioception and strengthening exercises was superior to a home exercise program.

Advice to 'act as usual' / reassurance / education

The practitioner should adopt a positive and supportive approach. He/she should acknowledge that the patient is hurt and has symptoms, and advise that:

- symptoms are a normal reaction to being hurt
- maintaining normal life activities is an important factor in getting better
- staying active is important in the recovery process
- voluntary restriction of activity may cause delayed recovery, and
- it is important to focus on improvements in function.

A summary of possible advice is described in Appendix 5 (page 69).

Summary of evidence regarding advice to 'act as usual' / reassurance

There is Grade B evidence (1/1 studies⁷⁵) supporting advice (alone) to "act as usual" over advice to rest and immobilisation in a soft collar. There were, however, 3 further studies^{68,70,72} that combined advice to 'stay active' or 'act as usual' with active exercise which showed a benefit over collar and / or rest.

Scholten-Peeters *et al.*⁷⁶ demonstrated similar treatment effectiveness (in terms of pain, headache and work activities outcomes) between GP care given by specially trained practitioners involving education and advice to stay active when compared to physiotherapy education, advice and exercises.

Formal education packages in the form of videos should be provided. Such education packages should include information to reassure the patient, provide advice regarding return to normal activities, information regarding pain relief and basic exercises aimed at restoring movement to the cervical spine, muscle re-education and strengthening [Grade B].

Summary of evidence regarding education

There is Grade B evidence supporting education. Two studies^{77,78} demonstrated the benefit of an educational video over usual care in an emergency department setting. One further study failed to demonstrate a benefit of an educational pamphlet (involving a 1 page, 10 dot point summary of important information regarding whiplash) as an adjunct to usual care. Given the strong evidence regarding advice to act as usual and reassurance, education in any form is a reasonable treatment option for clinicians.

Treatments that may be undertaken provided there is ongoing evidence of benefit

Passive joint mobilisation / manipulation

Passive joint mobilisation / manipulation may be given in combination with active exercises, in situations where exercise and advice alone are not proving effective, provided there is evidence of continuing measurable improvement. This technique should be restricted to registered health professionals trained in the specific methods of passive joint mobilisation and manipulation and undertaken according to current professional standards. WAD Grade III (decreased or absent tendon reflexes and / or weakness and sensory deficit) is a relative contra-indication for manipulation.

Summary of evidence regarding passive joint mobilisation / manipulation

There is Grade C evidence for the use of joint mobilisation/manipulation. Two related low quality papers^{79,80} using the same study population were identified that supported the use of manipulation over a program involving ultrasound, exercises, multimodal therapy and pulsed EMG. Passive joint mobilisation was also found to be beneficial in two studies when used in combination with active therapy over rest and collar use.^{70,71} Passive joint mobilisation was found to be beneficial when used in combination with posture correction, relaxation exercises and psychological support compared with passive electrotherapy.⁸¹

Electrotherapy / passive modalities

Passive modalities / electrotherapies include heat, ice, massage, TENS, pulsed electromagnetic therapy, electrical stimulation, ultrasound and shortwave diathermy. These passive modalities / electrotherapies are optional adjuncts to exercise and manual therapy in situations where the patient is not improving with active exercise/advice alone, provided there is emphasis on return to usual activity as soon as possible. The clinician should demonstrate continuing measurable improvement with the use of these modalities.

Summary of evidence regarding electrotherapies / passive modalities

There is Grade C evidence for the use of these modalities. Three identified studies highlighted a benefit of this form of therapy. Foley-Nolan *et al.*⁸² demonstrated a benefit of pulsed EMG plus collar over the use of a collar alone. However, subjects in this trial were required to wear a collar for 8 hours per day for 12 weeks - which is strongly contra-indicated. Hendriks & Horgan⁸³ demonstrated a benefit of low frequency interrupted direct current as an adjunct to 'standard' emergency care; however, care should be taken with interpretation of these results given the low quality of this trial (PEDro score 3/10). Thuile & Walzl⁸⁴ demonstrated a benefit of magnetic field therapy as an adjunct to medication; however caution should again be taken when interpreting this result given the low study quality (PEDro 2/10). In contrast, Provinciali *et al.*⁸¹ showed benefits of a program involving joint mobilisation, relaxation therapy, posture correction and psychological support when compared to passive electrotherapy involving ultrasound and TENS.

Pharmacotherapy

WAD Grade I - III – Simple (non-opioid) analgesics and NSAIDs can be used to alleviate pain in the short term. Their use should be limited and weighed against known side effects, which appear to be dose related.

Use of high dose intravenous methylprednisolone infusion for acute management of WAD Grade I - III is not recommended given the potential for side-effects and the method of administration in the one study showing benefit of this form of treatment (intravenous bolus in the first 48 hours post accident).

Summary of evidence regarding pharmacotherapy

There is Grade B evidence for the use of pharmacotherapy. One study⁸⁵ highlighted a benefit of an NSAID (Tenoxicam) over a placebo in terms of pain and function outcomes. Pettersson & Toolanen⁸⁶ demonstrated a benefit of an infusion of high dose methylprednisolone administered intravenously in the first 48 hours after an accident compared with a placebo. However this treatment is not recommended given the known side effects of this drug.

Multimodal therapy

The term ‘multimodal therapy’ encompasses a range of individual treatment modalities such as joint mobilisation, relaxation techniques, electrotherapies and exercises as part of a package to address individual patient deficits such as pain, loss of range of movement and loss of strength. Treatment packages that are “multimodal” in nature and address a range of patient deficits such as loss of range of motion and strength may be used provided there is continuing evidence of benefit. Ideally, such packages should include an active treatment component.

Summary of evidence regarding multimodal treatment

There is Grade B evidence regarding multimodal therapy. A number of studies^{68-73,75,81} highlighted the benefits of treatment packages involving a number of treatment modalities. Only one of these studies⁸¹ used the term multimodal therapy. This therapy, which involved passive joint mobilisation, relaxation therapy, posture correction and psychological support, was shown to be beneficial over electrotherapy. Although this treatment was accorded a Grade B rating using the NHMRC grading scale, it is impossible to determine whether all the elements are necessary, or if not, which ones are providing benefit.

Treatments that *should not* be undertaken

Immobilisation – collars or collars and rest

Collars should not be prescribed for WAD. If they are prescribed they should not be used for greater than 48 hours.

Summary of evidence regarding collars

There is Grade evidence *against* the use of cervical collars and advice to rest. Seven studies^{68-73,75} demonstrated that active treatment was more beneficial than immobilisation in a soft collar and rest.

It is not possible to separate the use of a collar and advice to rest, as the studies combined the two features and gave varying advice on the periods of time the collar should be worn. One study⁸⁷ demonstrated no difference in outcome between 2 or 10 day collar immobilisation. Gennis *et al.*⁸⁸

further demonstrated no difference in outcome between collar immobilisation with analgesia compared to rest and analgesia.

Treatments that *should not* be undertaken until evidence is available

Surgical treatment

There are no indications for surgical intervention in almost all cases of acute and sub-acute WAD Grades I - III. Surgery should be restricted to the rare Grade III WAD with persistent arm pain consistent with cervical radiculopathy (supported by appropriate investigations) that does not respond to conservative management, or with rapidly progressing neurological deficit. Surgical treatment to reduce dislocation or stabilise the cervical spine may be required in WAD IV.

Summary of evidence regarding surgical treatment

There were no studies identified concerning the benefit of surgical intervention in the treatment of acute WAD Grade I - III.

Cervical pillows

Cervical pillows are not recommended.

Summary of evidence regarding cervical pillows

There were no studies identified concerning the benefit of cervical pillows in the treatment of acute WAD Grade I - III.

Intra-articular and Intrathecal injections

Intra-articular and intrathecal steroid injections are not recommended for acute WAD.

Summary of evidence regarding intra-articular and intrathecal injections

There were no studies identified concerning the benefit of intraarticular and intrathecal injections in the treatment of acute WAD Grade I - III.

Pharmacotherapy – Methylprednisolone

The use of high dose intravenous methylprednisolone infusion for acute management of WAD Grade I - III is not recommended given the potential side effects.

Summary of evidence regarding Methylprednisolone

There is Grade B evidence for the use of methylprednisolone. Pettersson & Toolanen⁸⁶ demonstrated a benefit of an infusion of high dose methylprednisolone administered in the first 48 hours after an accident compared with a placebo. However, this treatment is not recommended given the known side effects of this drug.

Treatment recommendations for chronic WAD

Table 6, below, summarises evidence and consensus based recommendations for the treatment of chronic whiplash. The evidence supporting each recommendation is discussed in detail in the following section.

Table 6 Treatment recommendations for chronic WAD

Chronic whiplash (> 12 weeks) treatment recommendations	Grade of Evidence
Treatments that should be routinely provided	
• Advice to 'act as usual' / reassurance	Grade B
• Active exercise (in combination with advice), involving functional exercises, range of motion exercises, strengthening of neck and scapular muscles, specific strengthening of deep neck flexors	Grade B
Treatments that may be undertaken provided there is ongoing evidence of benefit	
• Cognitive behavioural approach	Grade C
• Passive joint mobilisation / manipulation, in combination with active therapy	☑
• Multimodal Therapy	☑
• Vestibular rehabilitation	Grade C
• Radiofrequency neurotomy (in carefully selected cases)	Grade B
• Subcutaneous sterile water injections (in carefully selected cases)	Grade C
Treatments that should not be undertaken	
• Collar immobilisation	☑
• Prescribed rest	☑
• Surgery (other than radiofrequency neurotomy)	☑
• Cervical pillows	☑
• Intrathecal and intra-articular injections	☑
• Botox injections	☑
• Electrotherapy	☑
• Analgesic injections	☑

Treatments that *should* be routinely undertaken

Advice to 'act as usual' / reassurance

The practitioner should adopt a positive and supportive approach. He/she should acknowledge that the patient has been hurt and has symptoms, and advise that:

- symptoms are a normal reaction to being hurt
- maintaining normal life activities is an important factor in getting better
- staying active is important in the recovery process
- voluntary restriction of activity may cause secondary complications such as loss of joint range of motion, muscle weakness and loss of cardiovascular fitness all of which will reduce functional capacity and delay recovery, and
- it is important to focus on improvements in function.

Summary of evidence regarding advice to 'act as usual' / reassurance

Two out of two studies^{89,90} demonstrated the benefits of reassurance and advice to "act as usual" as part of a package involving specific muscle control exercises, general exercises and joint mobilisation. The evidence is rated Grade B in the NHMRC schema because of the difficulty of ascribing the degree of benefit of these elements of the studies.

Active exercise

Active exercise (in combination with advice) [involving functional exercises, range of motion exercises, strengthening of neck and scapular muscles, specific strengthening of deep neck flexors.

There is Grade B evidence for the use of functional exercises, ie range of movement (ROM), mobilising and muscle re-education / strengthening exercises for the neck and scapular muscles and in particular exercises for the deep neck flexors in the chronic WAD stage. The aim of these exercises is to restore appropriate muscle control and support to the cervical region and restoration of strength, movement and cardiovascular fitness to allow the performance of everyday tasks. The performance of functional tasks should be reinforced. Emphasis should be placed on the quick return to activities of daily living and work tasks. A number of suitable exercises are listed in Appendix 6 (page 71).

Summary of evidence regarding active exercise

Three studies⁸⁹⁻⁹¹ highlighted the benefits of an active exercise approach. Stewart *et al.*⁹⁰ demonstrated the benefits of an individualised, sub-maximal functionally based exercise program, conducted with a cognitive behavioural approach as an adjunct to advice. Jull *et al.*⁸⁹ demonstrated a benefit of a program involving specific muscle control exercises, kinaesthetic exercises, passive joint mobilisation, education and assurance over a self-management program involving advice to stay active, description of an exercise program and postural and ergonomic advice. Fitz-Ritson⁹¹ demonstrated that phasic exercises (eye-head-neck-trunk and eye-head-neck-arm exercises) plus chiropractic treatment was more beneficial than standard exercises (stretching / isometric / isokinetic) plus chiropractic treatment. Unfortunately these exercises are not easily adopted as neither program was clearly described. The evidence for active exercise was rated Grade B because the three studies have different treatment elements in their trials.

Treatments that *may be undertaken* provided there is ongoing evidence of benefit

Cognitive behavioural approaches to therapy

A cognitive behavioural approach to treatment may be instituted. The basics of this approach include: pacing, shaping, appropriate reinforcement, and addressing fear avoidance. This approach, involving a gradual resumption of normal activities, has been used successfully with other forms of chronic spinal pain. Note that a cognitive behavioural approach differs from formal Cognitive Behavioural Therapy. A basic outline of Cognitive Behavioural Therapy (CBT) may be seen in Appendix 7 (page 74).

Summary of evidence regarding a cognitive behavioural approach

There is Grade C evidence supporting a cognitive behavioural approach. Two of three studies^{90,92} demonstrated a benefit of a cognitive behavioural approach as an addition to standard physiotherapy treatment and as part of an exercise program respectively. Physiotherapists delivered the cognitive behavioural approach, and the components of therapy included varied between studies. They included learning basic psychological skills, goal setting, application to daily activities, and education. It was not possible to determine whether formal cognitive re-evaluation strategies were included as part of the 'approach'. The evidence was rated Grade C due to the difficulty in separating the benefit of the cognitive behavioural component from the benefit of active treatment (exercise).

Passive joint mobilisation / manipulation (in combination with active therapy)

Passive joint mobilisation / manipulation may be given in combination with exercises in the chronic phase provided there is evidence of continuing measurable improvement. Reliance on passive therapy alone without an "active" component is not recommended in the chronic phase. This technique should be restricted to registered health professionals trained in the specific methods of passive joint mobilisation and manipulation and undertaken according to current professional standards. WAD Grade III (decreased or absent tendon reflexes and / or weakness and sensory deficit) is a relative contra-indication for manipulation.

Summary of evidence regarding passive joint mobilisation

Passive joint manipulation was included on the basis of consensus. One high quality study⁸⁹, demonstrated a benefit of passive joint mobilisation when used in combination with specific muscle control exercises, kinaesthetic exercises, education and assurance over a self-management program involving advice to stay active, description of an exercise program and postural and ergonomic advice. A further study⁹¹ described the benefit of passive joint manipulation in combination with 'phasic exercises', however the latter exercises were not well described.

Vestibular rehabilitation

A vestibular rehabilitation program may be instituted for patients experiencing dizziness in the chronic phase. The institution of vestibular rehabilitation should be limited to practitioners specifically trained in such techniques.

Summary of evidence regarding vestibular rehabilitation

There is Grade C evidence supporting vestibular rehabilitation. One medium quality study⁹³ demonstrated a small clinical improvement in a group exhibiting dizziness that received a vestibular exercise program compared to a control group receiving no intervention.

Multimodal therapy

Treatment packages that are 'multimodal' in nature and address a range of patient deficits such as loss of range of motion and strength may be used provided there is continuing evidence of benefit. Such packages should include an active treatment component in the chronic phase.

Summary of evidence regarding multimodal therapy

Multimodal therapy was included on the basis of consensus. One study⁸⁹ demonstrated a benefit of a multimodal program involving specific muscle control exercises, kinaesthetic exercises, passive joint mobilisation, education and assurance over a self-management program involving advice to stay active, description of an exercise program and postural and ergonomic advice.

Radiofrequency neurotomy

There is Grade B evidence to support radiofrequency neurotomy for chronic whiplash sufferers whose symptoms have been shown by diagnostic blocks to arise from the lower cervical joints. This surgical technique should only be undertaken after other conservative treatment has been shown to be ineffective and when facet joint pain has been confirmed by a local anaesthetic block.

Summary of evidence regarding radiofrequency neurotomy

One high quality study⁹⁴ demonstrated long term benefit of radiofrequency neurotomy to highly selected whiplash patients with confirmed facet joint pain compared with patients receiving a placebo.

Subcutaneous sterile water injections

There is Grade C evidence regarding the use of subcutaneous sterile water injections in carefully selected cases. The use of this technique should be limited to practitioners with expertise in such injections.

Summary of evidence regarding subcutaneous sterile water injections

One moderate quality study⁹⁵ demonstrated that subcutaneous sterile water injections (2-3mm subcutaneous) over up to 30 trigger points were significantly more effective in providing pain relief and improving ROM immediately and after 8 months than those receiving saline injections.

Treatments that *should not* be undertaken

Collar immobilisation

Collar immobilisation should not be undertaken with chronic whiplash.

Summary of evidence regarding collar immobilisation

There is no evidence to support a regime of collar immobilisation with chronic whiplash. This recommendation was included as a consensus point given that there was Grade A evidence *against* the use of collars and prescribed rest during the acute phase (refer page 34).

Prescribed rest

A period of prescribed rest is not recommended for chronic whiplash.

Summary of evidence regarding prescribed rest

There is no evidence to support a period of prescribed rest in chronic whiplash. This recommendation was included as a consensus point given the evidence supportive active rather than passive treatment.

Intra-articular and intrathecal injections

Intra-articular and intrathecal steroid injections are not recommended for acute WAD.

Summary of evidence regarding intra-articular and intrathecal injections

There were no studies identified concerning the benefit of intrathecal injections in the treatment of chronic WAD grade I-III. Barnsley *et al.*⁹⁶, in a high quality RCT (7/10), failed to demonstrate any benefit of intra-articular corticosteroid injections over local anaesthetic injections in terms of time to return of usual pain.

Treatments that *should not* be undertaken until evidence is available**Surgical treatment (other than radiofrequency neurotomy)**

There are no indications for surgical intervention (aside from radiofrequency neurotomy) in almost all cases of chronic WAD Grades I - III. Surgery should be restricted to the rare Grade III WAD with persistent arm pain consistent with cervical radiculopathy (supported by appropriate investigations) that does not respond to conservative management, or with rapidly progressing neurological deficit.

Summary of evidence regarding surgical treatment

There were no studies identified concerning the benefit of surgical intervention (aside from radiofrequency neurotomy) in the treatment of chronic WAD grade I-III.

Cervical pillows

Cervical pillows are not recommended.

Summary of evidence regarding cervical pillows

There were no studies identified concerning the benefit of cervical pillows in the treatment of chronic WAD grade I-III.

Botulinum Toxin (Botox) Injections

The use of Botox injections in chronic whiplash is not recommended.

Summary of evidence regarding Botox injections

There is conflicting evidence with regard to Botox injections. Freund & Schwartz⁹⁷ found short-term benefits (4 weeks) in terms of pain and ROM in a group of WAD patients receiving botulinum injections versus those receiving saline. Conversely, Padberg *et al.*⁹⁸ found no benefit of botulinum injections in 40 WAD patients compared with those receiving placebo injections.

Electrotherapy

The use of electrotherapy in the treatment of chronic whiplash is not recommended.

Summary of evidence regarding electrotherapy

There were no studies identified concerning the benefit of electrotherapy in the treatment of chronic WAD grade I-III. Evidence favours active treatment⁸⁹⁻⁹¹ and reliance on passive therapy should be avoided.

Analgesic injections

Analgesic injections are not recommended for the treatment of chronic WAD.

Summary of evidence regarding analgesic injections

There is Grade B evidence for the use of analgesic injections. Lemming *et al.*⁹⁹, demonstrated that three different analgesics produced significant reductions in pain compared with a placebo whilst infusion of drugs was taking place. However, no long-term difference in effectiveness of any drug over placebo was demonstrated.

CONSIDERATION OF SOCIO-ECONOMIC ASPECTS

Socio-economic factors associated with WAD

Socio-economic factors were considered when preparing these guidelines. None of the recommendations were found to preferentially benefit or disadvantage any particular socioeconomic group other than through the issue of geographical access to health services in general.

One factor, which was found to be prognostic for poorer outcomes, was level of completed education (Grade A evidence). People without a university education were twice as likely to have ongoing disability at 16 months post MVA than those with a university education⁵⁸. Similarly, Berglund ³¹ found that those with a lower education level (primary / low secondary) were also nearly twice as likely not to recover at 12 months post MVA than those who were more highly educated (college/ university). Obtaining information about an individual's education level was therefore recommended as part of the assessment of whiplash.

It is likely that individuals in South Australia who live in rural/remote areas of the state will have poorer access to health professionals and health services of all types. As the guidelines refer to the need for specialist assessment and treatment in some circumstances (those not recovering after six weeks of appropriate treatment), it is possible that individuals living in these areas may be disadvantaged. Data provided in *A social health atlas of compensable injury in South Australia* ¹⁰⁰ show that individuals living in rural South Australia are 73% less likely to make a claim for compensation following MVA than those living in Adelaide.

Economic impact of WAD guidelines

No relevant cost-effectiveness studies were found in the WAD literature review, which was broad-based. Also, it was not possible to conduct a full evaluation of the cost-effectiveness of implementing the WAD guidelines as data on which to base estimates are not currently available on people with whiplash-associated disorders in South Australia.

Instead, a limited scenario-based costing exercise was undertaken based on the proportion of WAD cases in each of four common WAD scenarios, estimated from interstate data. The analysis modeled changes only in treatment costs if the guidelines were applied, and not changes in outcomes (that is, recovery rates), and can therefore be considered conservative. This resulted in a reduction in treatment cost of AUD\$737,000 per 1,000 people with whiplash-associated disorders. The results are summarised in an internal report commissioned by TRACsa, and it is intended to undertake more accurate estimates in future when data become available.

APPENDIX

Appendix 1: Membership and terms of reference of the advisory and working groups

Thanks to the research consultants and the Technical Advisory Group (TAG) who guided this project. In establishing this TAG, TRACsa was aware that primary care health professionals, especially general practitioners, physiotherapists and chiropractors, manage much of the treatment arising from whiplash-associated disorders.

Research consultants

Professor Ian Cameron	Professor of Rehabilitation Medicine, University of Sydney
Professor Maria Crotty	Director, Flinders University Rehabilitation Studies Unit, Adelaide
Dr Julie Halbert	Research Manager, Repatriation General Hospital, Adelaide
Professor Paddy Phillips	Professor and Head of Medicine, Flinders Medical Centre and Repatriation General Hospital, Adelaide
Dr Trudy Rebbeck	Physiotherapist, University of Sydney
Mr James Schomburgk	Musculoskeletal Physiotherapist, Adelaide
Dr Michael Shanahan	Occupational Physician / Rheumatologist, Repatriation General Hospital, Adelaide
Dr Jim Stewart	Project Manager, University of Sydney
Dr Mark Stewart	Physiotherapist, University of Sydney
Dr Lyndal Trevena	General Practitioner, University of Sydney

Technical Advisory Group

The purpose of this group was to review drafts of the documents, particularly when consensus was required for areas where evidence was inconsistent or lacking, prior to them being presented to the full Steering Committee. This Group was also critical in resolving issues where wider consultation had not achieved consensus.

Members:

Dr Frida Cheok	Program Manager, TRACsa
Mr Mark Cox	Psychologist / Physiotherapist, Adelaide
Dr Philip Donato*	Chiropractor, Adelaide

Dr Oliver Frank	General Practitioner, Adelaide
Dr Angela McLean*	Medical Advisor, TRACsa
Dr Orso Osti	Orthopaedic Surgeon, The Queen Elizabeth Hospital, Adelaide
Dr Michele Sterling	Physiotherapist, Associate Director, CONROD, University of Queensland
Ms Tracy Merlin	NHMRC GAR Consultant
Mr John Viececi	Physiotherapist, Adelaide
Ms Roberta Morris	Senior Project Officer, TRACsa
Ms Sam Laubsch*	Health Consumers Alliance, Adelaide
Ms Mardi Boxall	Executive Director, Health Consumers Alliance, Adelaide

* These people were also members of the Best Practice Taskforce.

Steering committee

The purpose of this committee was to receive progress reports from the consultants and to sign off on completed parts of the work.

Members:

Ms Liz Furler (Chair)	Executive Director, TRACsa
Dr Frida Cheok	Program Manager, TRACsa
Mr Kevin Holohan*	Physiotherapist, Adelaide
Dr Angela McLean*	Medical Advisor, TRACsa
Dr Goran Mladenovic	Chiropractor, Adelaide
Dr Patricia Montanaro*	Medical Consultant, WorkCover SA
Dr Tony Ryan*	Public Health Physician, Adelaide
Ms Roberta Morris*	Senior Project Officer, TRACsa

* These people were also members of the Best Practice Taskforce.

Best Practice Taskforce

The purpose of this committee was to oversee the project, foster a shared view regarding the assessment and treatment of whiplash associated disorders across disciplines, stakeholders and settings, and to provide advice on strategies and activities to maximize dissemination and uptake of the Guidelines.

Dr Rob Atkinson	Orthopaedic Surgeon, Clinical Associate Professor, University of Adelaide
Mr John Baranoff	Australian Psychological Society (APS) SA Branch
A/Professor Malcolm Battersby	Psychiatrist, Director, Human Behaviour & Health Research Unit, Flinders University of South Australia,
Ms Joanne Deuter	Barrister, Representing the Law Society of SA, & Australian Lawyers Alliance (ALA)
Dr Peter Jezukaitis	Orthopaedic Surgeon, Adelaide
Ms Lydia Ksiakiewicz	Occupational Therapy Australia (OTA)
Dr James McLennan	SA Branch of AMA, SA Divisions of General Practice, RACGP, RDAA, ACRRM
Dr Cathy Sanders	SA Branch of AMA, & SA Divisions of General Practice, RACGP
Ms Alex Ward	Barrister, Representing the Law Society of SA, & Australian Lawyers Alliance (ALA)
Ms Libby Whitehorn	Representing Alliance Insurance

Appendix 2: Process report

Background

In 2006 the South Australian Centre for Trauma and Injury Recovery Inc. (TRACsa) commissioned a comprehensive report on the best practice management (including assessment, prognosis and treatment) of acute and chronic whiplash-associated disorders. It was a requirement that the work be performed to meet NHMRC standards for externally developed guidelines. The *Clinical guidelines for best practice management of acute and chronic whiplash-associated disorders* and the associated *Evidence report* are the results of this initiative. The work aims to incorporate evidence gathered from comprehensive systematic reviews of diagnosis, prognosis and treatment of acute and chronic WAD. Details of the methodology and search strategies are provided in chapters 3, 4 and 5 of the *Evidence report*.

Research consultants were appointed and they reported to a multidisciplinary Technical Advisory Group (TAG). The TAG in turn was monitored by a Steering Committee chaired by the Executive Director of TRACsa.

A Best Practice Taskforce (BPT) was formed to auspice the project. The role of the BPT was to:

- develop multi disciplinary consensus about recognised best practice and treatment of soft tissue injuries
- foster an up to date and shared view across disciplines and setting on the nature of soft tissue injury
- advise TRACsa on strategies for implementation of the guidelines in the health, legal and compensation communities in South Australia.

The BPT comprised:

health professionals from a range of disciplines

experts in research design and methodology and clinical and population health epidemiology

representatives from the insurance industry, the South Australian Motor Accident Commission, Workcover SA

the legal profession

a consumer representative.

These persons are listed in Appendix 1.

The process

The research consultants developed a comprehensive systematic review protocol, which was reviewed and endorsed by the NHMRC GAR (Guidelines Assessment Register) consultant, Ms Tracy Merlin. Literature reviews were undertaken and relevant studies were extracted and summarised. The methodology for the review of diagnosis, prognosis and treatment of WAD is given in the *Evidence report* and at page 6 of this document. The NHMRC processes for determining the level of evidence in a study, and assessing and grading the body of evidence were followed. See Appendix 3. Draft reports

of different elements of the study, including recommendations, were regularly reviewed by the TAG and the GAR consultant. Where appropriate, and where evidence was lacking or inconsistent, 'good practice points' were developed.

Consultation

In addition to extensive review by members of the TAG and the BPT, the draft Clinical Pathway was discussed with several focus groups, including general practitioners, consumers, physiotherapists, chiropractors and psychologists.

A draft version of the Clinical guidelines for best practice management of acute and chronic whiplash associated disorders and the Evidence report were released for public consultation. The general public was advised of the WAD Guidelines through advertisements in The Australian and The Advertiser newspapers and the TRACsa website. In addition key stakeholder and consumer groups were sent individualised letters alerting them to the consultation process. The BPT considered feedback from the consultation process, and the draft document was amended. A formal letter of reply was sent to all individuals and organizations that provided feedback outlining the response taken by the BPT.

The outcomes of the consultation process suggested:

There appeared to be a biomedical emphasis to the guidelines.

A greater focus on psychological, social, and compensation issues would enhance the guidelines relevance in a practice setting.

Greater acknowledgement of overlap with other musculoskeletal areas of injury, and inclusion of evidence-based therapies helpful in chronic pain management, would enhance the recommendations.

These limitations were acknowledged in the preface of the document. To address these, members of the BPT guided the development of a companion document, the *Whiplash-associated disorders clinical resource guide*. The resource guide distils evidence-based recommendations for WAD, and includes evidence from other chronic pain states. In particular, the guide aims to foster a biopsychosocial approach to the assessment and treatment of people with whiplash-associated disorders.

Many comments related to inconsistencies in language and reporting, highlighted semantic issues, or reflected divergent opinion among professional disciplines about treatment options, and those best placed to deliver them. The consultation process provided valuable assistance in increasing the accuracy, clarity and comprehensiveness of the document.

The following individuals and organizations were involved in the consultation process:

Dr Robert Atkinson	Orthopaedic Surgeon, Clinical Associate Professor, University of Adelaide
Hon Dr Michael Armitage	Chief Executive Officer, Australian Health Insurance Associated Ltd.
Dr Peter Barrett	Physiotherapist, Bayside and West lakes Manipulative Physios
Dr David Butler	Director, Neuro Orthopaedic Institute
Ms Tina Bidese	On behalf of NSW Motor Accidents Authority

Ms Michelle Carse	On behalf of Workcover Corporation South Australia
Dr Lucy Chipchase	President, Australian Physiotherapy Association, SA Branch
Rebecca Forbes	Senior Executive Officer, Australian Faculty of Rehabilitation Medicine
Dr Neil Jones	Radiologist, Flinders Medical Centre
A Prof Jacques C Metzger	Chair, Australian Psychological Society, SA Branch
Dr Rakesh Mohindra	Chair, SA&NT Faculty, Royal Australian College of General Practitioners
Dr Rosemary Toalster	UQ Health Service, University of Queensland
Mr Brian Whitford	OT Australia SA
Dr Jennie Wright	General Practitioner, Musculoskeletal Medicine
Ms Sam Laubsch	Executive Director, Health Consumers Alliance of SA Inc.

Consumer involvement

Two consumers were included in the TAG, and a consumer representative also contributed to the BPT. These persons were involved in all stages of the development process, including the development of the education dissemination strategy. Seven consumers were consulted regarding their experiences of the health and insurance systems following a whiplash injury, and a group of twenty consumers provided feedback regarding the content and structure of a consumer resource guide. In addition, representatives from consumer groups were invited to provide feedback on the draft guidelines.

Implementation

A separate *Implications report* was developed which makes recommendations regarding the dissemination of the best practice guide, and fostering its implementation in practice. The report includes proposals for education of different practitioner groups, lawyers, case managers, and consumers, and methodologies to evaluate the impact of the guidelines in terms of uptake and changed clinical practice. Members of the Best Practice Taskforce guided the development of a professional education program to be provided to general practitioners and other health professionals.

Strategies for the implementation of the guidelines into clinical practice include:

- launch of the guidelines at the Better Choices Better Health - Improving Compensation Outcomes Conference: Adelaide 23 - 26 November 2008
- formal education sessions for general practitioners through the Royal Australian College of General Practitioners which will attract professional development points, similar sessions for other health professionals attracting professional points from their various registration bodies
- a communications strategy including newsletters, access to the guidelines and companion documents on the TRACsa website, distribution of fact sheets, media releases, seminars at community centers, and articles in local newspapers

- dissemination of information through professional association publications and conferences, auspiced through members of the BPT
- distribution of a booklet for consumers via claims managers
- academic profiling –one-on-one visits by a trained health professional to general practitioners and other health professionals
- educational outreach visits by a trained educator delivering information to health professionals at medical centers and/or pain management clinics, with an emphasis on those practices known to be ‘high volume’ providers of services to persons with whiplash-associated disorders.

Review

Interest in the etiology, diagnosis and treatment of WAD is intense and so this is a rapidly changing area. The Pathway will need to be revised within five years (June 2013), in order that the recommendations for practice remain valid. This may occur earlier if compelling new evidence is published.

This process report also appears in the *Evidence report*, a systematic review of evidence related to the diagnosis/assessment, prognosis and treatment of acute and chronic WAD.

Appendix 3: The NHMRC process for determining grades of evidence

(from the NH&MRC additional levels of evidence and grades for recommendations for developers of guidelines- Pilot Program 2005-2007¹³)

Table 7 Designations of levels of evidence

(from a study according to type of research question)

Level	Intervention	Diagnosis	Prognosis
I	A systematic review of level II studies	A systematic review of level II studies	A systematic review of level II studies
II	A randomised controlled trial	A study of test accuracy with: an independent, blinded comparison with a valid reference standard, among consecutive patients with a defined clinical presentation.	A prospective cohort study
III-1	A pseudo-randomised controlled trial (ie alternate allocation or some other method)	A study of test accuracy with: an independent, blinded comparison with a valid reference standard, among non-consecutive patients with a defined clinical presentation.	All or none
III-2	A comparative study with concurrent controls	A comparison with a reference standard that does not meet the criteria required for Level II and III-1 evidence	Analysis of prognostic factors amongst untreated control patients in a randomised controlled trial
III-3	A comparative study without concurrent controls	Diagnostic case-control study	A retrospective cohort study
IV	Case series with either post-test or pre-test / post-test outcomes	Study of diagnostic yield (no reference standard)	Case series, or cohort study of patients at different stages of disease

Table 8 NHMRC Body of evidence assessment matrix

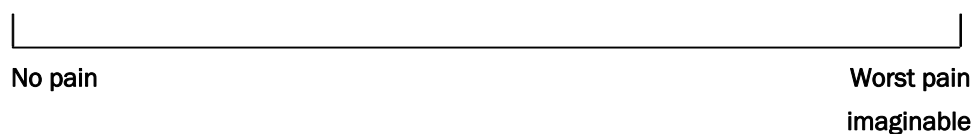
Component	A Excellent	B Good	C Satisfactory	D Poor
Evidence Base	Several level I or II studies with low risk of bias	One or two level II studies with low risk of bias or a SR/multiple level III studies with low risk of bias	Level III studies with low risk of bias, or level I or II studies with moderate risk of bias	Level IV studies, or level I to III studies with high risk of bias
Consistency	All studies consistent	Most studies consistent and inconsistency may be explained	Some inconsistency reflecting genuine uncertainty around clinical question	Evidence is inconsistent
Clinical impact	Very large	Substantial	Moderate	Slight or restricted
Generalisability	Population/s studied in body of evidence are the same as the target population for the guideline	Population/s studied in body of evidence are similar as the target population for the guideline	Population/s studied in body of evidence are different to target population for the guideline but it is clinically sensible to apply this evidence to target population	Population/s studied in body of evidence are different to target population and hard to judge whether it is sensible to generalise to target population
Applicability	Directly applicable to Australian healthcare context	Applicable to Australian healthcare context with few caveats	Probably applicable to Australian healthcare context with some caveats	Not applicable to Australian healthcare context

Table 9 NHMRC Grades of evidence for recommendations

Grade of recommendation	
A	Body of evidence can be trusted to guide practice
B	Body of evidence can be trusted to guide practice in most situations
C	Body of evidence provides some support for recommendation (s) but care should be taken in its application
D	Body of evidence is weak and recommendation must be applied with caution

Appendix 4: Outcome measures for the assessment of WAD

Visual Analogue Scale



The Visual Analogue Scale (VAS)¹⁹ is a subjective measure of pain. It consists of a 10cm line with two end-points representing 'no pain' and 'worst pain imaginable'. Patients are asked to rate their pain by placing a mark on the line corresponding to their current level of pain. The distance along the line from the 'no pain' marker is then measured with a ruler giving a pain score out of 10.

The Neck Disability Index

The Neck Disability Index (NDI)²⁰ (see below) is designed to measure neck-specific disability. The questionnaire has 10 items concerning pain and activities of daily living including personal care, lifting, reading, headaches, concentration, work status, driving, sleeping and recreation. Each item is scored out of 5 (with the no disability response given a score of 0) giving a total score for the questionnaire out of 50. Higher scores represent greater disability. The result can be expressed as a percentage (score out of 100) by doubling the total score. The Neck Disability Index is translated into over 20 languages.

Instructions

This questionnaire has been designed to give your health professional information as to how your neck pain has affected your ability to manage in everyday life. Please answer every section and mark in each section only the ONE box which applies to you. We realise you may consider that two of the statements in any one section relate to you, but please just mark the box which most closely describes your problem.

Section 1 - Pain intensity

- ☐ I have no pain at the moment.
- ☐ The pain is very mild at the moment.
- ☐ The pain is moderate at the moment.
- ☐ The pain is fairly severe at the moment.
- ☐ The pain is very severe at the moment.
- ☐ The pain is the worst imaginable at the moment.

Section 2 - Personal care (washing, dressing etc)

- ☐ I can look after myself normally without causing extra pain.
- ☐ I can look after myself normally but it causes extra pain.
- ☐ It is painful to look after myself and I am slow and careful.
- ☐ I need some help but manage most of my personal care.
- ☐ I need help every day in most aspects of self-care.
- ☐ I do not get dressed, I wash with difficulty and stay in bed.

Section 3 - Lifting

- ☐ I can lift heavy weights without extra pain.
- ☐ I can lift heavy weights but it gives extra pain.
- ☐ Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently positioned, for example on a table.
- ☐ Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned.
- ☐ I can lift very light weights.
- ☐ I cannot lift or carry anything at all.

Section 4 - Reading

- ☐ I can read as much as I want to with no pain in my neck.
- ☐ I can read as much as I want to with slight pain in my neck.
- ☐ I can read as much as I want with moderate pain in my neck.
- ☐ I cannot read as much as I want because of moderate pain in my neck.
- ☐ I can hardly read at all because of severe pain in my neck.
- ☐ I cannot read at all.

Section 5 - Headaches

- ☐ I have no headaches at all.
- ☐ I have slight headaches which come infrequently.
- ☐ I have moderate headaches which come infrequently.
- ☐ I have moderate headaches which come frequently.
- ☐ I have severe headaches which come frequently
- ☐ I have headaches almost all the time.

Section 6 - Concentration

- ☐ I can concentrate fully when I want to with no difficulty.
- ☐ I can concentrate fully when I want to with slight difficulty.
- ☐ I have a fair degree of difficulty in concentrating when I want to.
- ☐ I have a lot of difficulty in concentrating when I want to.
- ☐ I have a great deal of difficulty in concentrating when I want to.
- ☐ I cannot concentrate at all.

Section 7 - Work

- ☐ I can do as much work as I want to.
- ☐ I can only do my usual work, but no more.
- ☐ I can do most of my usual work, but no more.
- ☐ I cannot do my usual work.
- ☐ I can hardly do any work at all.
- ☐ I cannot do any work at all.

Section 8 - Driving

- ☐ I can drive my car without any neck pain.
- ☐ I can drive my car as long as I want with slight pain in my neck.
- ☐ I can drive my car as long as I want with moderate pain in my neck.
- ☐ I cannot drive my car as long as I want because of moderate pain in my neck.
- ☐ I can hardly drive at all because of severe pain in my neck.
- ☐ I cannot drive my car at all.

Section 9 - Sleeping

- ☐ I have no trouble sleeping.
- ☐ My sleep is slightly disturbed (less than 1 hr sleepless).
- ☐ My sleep is mildly disturbed (1-2 hrs sleepless).
- ☐ My sleep is moderately disturbed (2-3 hrs sleepless).
- ☐ My sleep is greatly disturbed (3-5 hrs sleepless).
- ☐ My sleep is completely disturbed (5-7 hrs sleepless).

Section 10 - Recreation

- ☐ I am able to engage in all my recreation activities with no neck pain at all.
- ☐ I am able to engage in all my recreation activities, with some pain in my neck.
- ☐ I am able to engage in most, but not all of my usual recreation activities because of pain in my neck.
- ☐ I am able to engage in a few of my usual recreation activities because of pain in my neck.
- ☐ I can hardly do any recreation activities because of pain in my neck.
- ☐ I cannot do any recreation activities at all.

The Functional Rating Index

The Functional Rating Index (FRI)²¹ combines concepts of the Oswestry Low Back Pain Disability Questionnaire and the Neck Disability Index to improve on clinical utility (time required for administration). It is an instrument specifically designed to quantitatively measure subjective perception of function and pain of the spinal musculoskeletal system in a clinical environment.

It consists of 10 questions each containing five statements representing increasing problems on that dimension. The questionnaire can be completed by the patient and scored by the therapist. It takes considerably less time to administer than the Neck Disability Index. For each section the maximum score is “4” with the first statement marked with a “0” and the last statement with a “4”. If all 10 sections are completed the maximum score is 40 points which is sometimes converted to a percentage. High percentages represent high disability.

Obtaining copies of the Functional Rating Index

The Functional Rating Index can be downloaded from the Institute of Evidence-Based Chiropractors at www.chiroevidence.com.

Solo practitioners or groups of up to 9 practitioners may copy and use The Functional Rating Index subject to the terms of the Limited Licence agreement outlined on the website. Groups of 10 or more practitioners must contact Dr R Feise (rjf@chiroevidence.com) at the Institute of Evidence-Based Chiropractors for licence agreement details.

The Self Efficacy Scale

The Self-Efficacy Scale (SES)²⁴ was initially designed to measure perceived self-efficacy in performing 20 common activities relevant to patients with chronic low back pain

Subjects are asked to rate how confident they are to perform each of a number of activities in spite of pain. The activities covered are listed below. The response format is 11-grade numerical rating scales where 0 = not at all confident and 10 = very confident. The total range is 0–200 points with higher scores indicating higher perceived self-efficacy.

Items

Taking out the trash

Concentrating on a project

Going shopping

Playing cards

Shovelling snow

Driving the car

Eating in a restaurant

Watching television

Visiting friends

Working on the car

Raking leaves

Writing a letter

Doing a load of laundry

Working on a house repair

Going to a movie

Washing the car

Riding a bicycle

Going on vacation

Going to a park

Visiting relatives

The Coping Strategies Questionnaire

The Coping Strategies Questionnaire (CSQ) was developed by Rosenstiel & Keefe²⁵ and is a widely used instrument for measuring pain coping strategies. The CSQ is a 50-item self-report questionnaire designed to assess 6 cognitive coping responses to pain and 2 behavioural responses. Subjects rate the frequency of their use of each coping strategy on a 7-point Likert-type scale, from (0) “Never” through (3) “Sometimes” to (6) “Always”.

The Catastrophising subscale of the CSQ (CSQ-CAT) (Rosenstiel and Keefe, 1983) has 6 items (see below)

It's terrible and I feel it's never going to get any better.

0	1	2	3	4	5	6
Never			Sometimes			Always

It's awful and I feel that it overwhelms me.

0	1	2	3	4	5	6
Never			Sometimes			Always

I feel my life isn't worth living.

0	1	2	3	4	5	6
Never			Sometimes			Always

I worry all the time about whether it will end.

0	1	2	3	4	5	6
Never			Sometimes			Always

I feel I can't stand it anymore.

0	1	2	3	4	5	6
Never			Sometimes			Always

I feel like I can't go on.

0	1	2	3	4	5	6
Never			Sometimes			Always

Patient-Specific Functional Scale

The Patient-Specific Functional Scale²² requires patients to generate their own list of problematic activities and assign a score to these activities rather than relying on a list of common activities. In the Patient-Specific Functional Scale subjects are asked to identify three important activities that they are unable to do or are having difficulty performing as a result of their neck problem. Subjects are asked to score each of these activities on an 11-point numeric rating scale (NRS) where 0 represents “unable to perform activity” and 10 represents “able to perform activity at pre-injury level”. Higher scores represent lower levels of disability. This measure is then repeated at appropriate follow-up points.

Instructions

Clinician to read and fill in. Please complete at the end of the history and prior to physical examination.

Read at baseline assessment

I'm going to ask you to identify up to 3 important activities that you are unable to do or have difficulty performing as a result of your problem.

Today, are there any activities that you are unable to do or have difficulty with because of your problem? (show scale)

Read at follow-up visits

When I assessed you on (state previous assessment date), you told me that you had difficulty with (read 1, 2, 3 from list).

Today do you still have difficulty with activity 1(have patient score this activity); 2 (have patient score this activity); 3 (have patient score this activity).

(scoring scheme appears overleaf)

Scoring scheme (show patient scale):

0	1	2	3	4	5	6	7	8	9	10
able to perform at pre-injury level										unable to perform at pre-injury level

Date/score

Activity									
1.									
2.									
3.									
Additional									
Additional									

Core Whiplash Outcome Measure

The Core Whiplash Outcome Measure (CWOM)²³ appears on the following page. This 5-item scale is brief and user friendly for clinicians. It measures several constructs of health including pain symptoms, function and well-being. In addition it measures the number of days off work, a useful measure for CTP insurers. The CWOM has high construct validity with the Functional Rating Index and the Neck Disability Index, and equal responsiveness in the short and long term as these lengthier measures.

Instructions

Score as follows:

Questions 1 and 2: Score from 1→5

Question 3: Score from 5→1

Questions 4 and 5: Score as follows 0-5 days = 1, 6-11 days = 2, 12-17 days = 3,

18-23 days = 4, 24+ days = 5.

The total score is created by summing the scores from each of the 5 items, where the minimum score for each item is 1 and the maximum score for each item is 5. Hence the total score for the CWOM varies from 5-25.

Core Whiplash Outcome Measure

Instructions for patient: Please answer questions 1 to 5

Date:

1. During the past week, how bothersome have your whiplash symptoms been?
 - ☐ 1 Not at all bothersome
 - ☐ 2 Slightly bothersome
 - ☐ 3 Moderately bothersome
 - ☐ 4 Very bothersome
 - ☐ 5 Extremely bothersome

2. During the past week, how much did your whiplash injury interfere with your normal work (including both work outside the home and housework)?
 - ☐ not at all
 - ☐ a little bit
 - ☐ moderately
 - ☐ quite a bit
 - ☐ extremely

3. If you had to spend the rest of your life with the whiplash symptoms you have right now, how would you feel about it?
 - ☐ very dissatisfied
 - ☐ somewhat dissatisfied
 - ☐ neither satisfied nor dissatisfied
 - ☐ somewhat satisfied
 - ☐ very satisfied

4. During the past 4 weeks, about how many days did you cut down on the things you usually do for more than half the day because of your whiplash symptoms?

_____ number of days

5. During the past four weeks, how many days did your whiplash symptoms keep you from going to work or school?

_____ number of days

The Kessler Psychological Distress Scale

The Kessler Psychological Distress Scale (K10)²⁷ is a simple measure of psychological distress. The K10 scale involves 10 questions about emotional states each with a five-level response scale. Each item is scored from 1 “none of the time” to 5 “All of the time”. Scores of the 10 items are then summed, yielding a minimum score of 10 and a maximum score of 50. Low scores indicate low levels of psychological distress and high scores indicate high levels of psychological distress.

Questions 3 and 6 do not need to be asked if the response to the preceding question was “none of the time”. In such cases questions 3 and 6 should receive an automatic score of one.

Please tick the answer that is correct for you:	All of the time (score 5)	Most of the time (score 4)	Some of the time (score 3)	A little of the time (score 2)	None of the time (score 1)
In the past 4 weeks, about how often did you feel tired out for no good reason?					
In the past 4 weeks, about how often did you feel nervous?					
In the past 4 weeks, about how often did you feel so nervous that nothing could calm you down?					
In the past 4 weeks, about how often did you feel hopeless?					
In the past 4 weeks, about how often did you feel restless or fidgety?					
In the past 4 weeks, about how often did you feel so restless you could not sit still?					
In the past 4 weeks, about how often did you feel depressed?					
In the past 4 weeks, about how often did you feel that everything was an effort?					
In the past 4 weeks, about how often did you feel so sad that nothing could cheer you up?					
In the past 4 weeks, about how often did you feel worthless?					

Interpretation of scores

The 2001 Victorian population health survey have adopted a set of cut off scores which may be used as a guide for screening for psychological distress.

These are outlined below:

K10 Score	Likelihood of having a mental disorder (psychological distress)
10-19	Likely to be well
20-24	Likely to have a mild disorder
25-29	Likely to have a moderate disorder
30-50	Likely to have a severe disorder

The Impact of Event Scale

The Impact of Event Scale (IES) was developed by Horowitz *et al.*²⁶ to measure current subjective distress related to a specific event. The IES is considered one of the earliest self-report measures of posttraumatic disturbance.⁴⁷

Below is a list of comments made by people after stressful life events. Using the following scale, please indicate below how frequently each of these comments was true for you DURING THE PAST SEVEN DAYS.

Comments	Not at all	Rarely	Sometimes	Often
1. I thought about it when I didn't mean to
2. I avoided letting myself get upset when I thought about it or was reminded of it
3. I tried to remove it from memory
4. I had trouble falling asleep or staying asleep because of pictures or thoughts about it that came into my mind
5. I had waves of strong feelings about it
6. I had dreams about it
7. I stayed away from reminders of it
8. I felt as if it hadn't happened or wasn't real
9. I tried not to talk about it
10. Pictures about it popped into my mind
11. Other things kept making me think about it
12. I was aware that I still had a lot of feelings about it, but I didn't deal with them
13. I tried not to think about it
14. Any reminder brought back feelings about it
15. My feelings about it were kind of numb

Scoring: Not at all = 0; Rarely = 1; Sometimes = 3; Often = 5 - Total = total the scores.

Scoring method: Each item is scored 0, 1, 3 or 5, with the higher scores reflecting more stressful impact. The scores for the intrusive subscale range from 0 to 35, and is the sum of the scores for items 1, 4, 5, 6, 10, 11, and 14. The scores for the avoidance subscale range from 0 to 40, and is the sum of the scores for items 2, 3, 7, 8, 9, 12, 13, and 15. The sum of the two subscales is the total stress score. It is suggested that the cut-off point is 26, above which a moderate or severe impact is indicated.

Information regarding the IES from: Devilly, G.J. (2004). Assessment Devices. Retrieved November 28, 2007, from Swinburne University, Clinical & Forensic Psychology website:
<http://www.swin.edu.au/victims/resources/assessment/assessment.html>

Appendix 5: Example of whiplash advice

(Stewart et al.⁹⁰ – originally based on abridged Indahl et al.¹⁰¹ advice)

Based upon what we know about whiplash, practitioners could answer questions / give advice in a way similar to this. Practitioners may also need to examine and address belief systems where appropriate

What is the cause of my pain?

Based upon my examination, you do not have anything **seriously** wrong with your neck. The problem you have is a simple sprain (of one of the discs or ligaments) in your neck. This injury produces inflammation, which may in turn lead to muscle spasm. The muscle spasm experienced can lead to further neck pain and stiffness and may be quite severe.

The muscle spasm or cramping that you get in your neck is much the same as what might happen in other parts of your body (for example your calf) and just as movement would help a leg cramp, so neck movement will help this pain.

When patients have neck pain, or anticipation of neck pain, this can make people want to hold their neck still but this is one of the worst things to do as this will lead to increased muscle spasm and more pain.

As it is now some time since your whiplash injury, it is quite safe to start returning to your normal activities. Light activity will not further damage the disc, ligament, joint or any other structure that could be involved in the process. Further, it is a general medical observation that light activity enhances the recovery process. Being overly cautious and avoiding activity is the worst thing to do as this may lead to secondary complications, which will delay recovery.

What you need to do is start light activity and set your own goals for increasing activity until you have returned to your normal (pre-injury) activities.

Many people are scared by their neck pain and this is natural. In most cases, however, this fear is unjustified. Fear of pain (emotional stress) will increase your neck pain by increasing muscle tension and this can lead to a vicious cycle which will lead to more fear and more pain. Again, an increase in pain does not mean you have re-injured your neck.

What will help?

You should try and move your neck and stretch as much as possible. You should try to avoid holding your neck stiffly and rather try to be as flexible as possible. Try to avoid holding your neck in the one position for extended periods, for example when studying.

Starting light activity and setting goals for increasing activity, moving and stretching are the best things to do for your neck.

What will make things worse and what does an increase in symptoms mean?

If you experience acute neck pain, this does not mean you have re-injured your neck- it is usually an acute muscle spasm and you should treat this with stretching and light activity.

The great majority of patients with whiplash-associated disorders recover. You can increase your chances of making a good recovery by changing how you view your neck pain.

Patients who take on a sick role by resting, taking time off work and avoiding jobs are less likely to recover. Being overly careful and avoiding activity is the worst thing you can do and will delay recovery. As discussed above, the best thing you can do is mobilise your neck with gentle activity and set your own goals for returning to work and other activities.

What self-management strategies can be used?

- Set your own goals for resuming activity
- Do not be afraid
- Do not be overcautious
- Try to adopt a flexible attitude
- Don't worry about doing something wrong

Appendix 6: Exercises that will help

(The information in this section is based on evidence of appropriate exercise components^{68,70,71,89,102}, and information from guidelines developed by the MAA¹² and University of Queensland¹⁰³)

The following exercises should help to heal your neck. Perform all exercises in a slow and controlled manner.

The exercises are designed to restore the movement and muscle control around your neck and to reduce unnecessary postural strain and muscle pain.

When you are performing the exercises, stop and contact your doctor or therapist if you notice:

- dizziness, light headedness, blurred vision, fainting or disorientation
- sudden pain shooting down your arm, or numbness or weakness in your arm or hand
- unusually severe neck pain
- exercises consistently producing a headache, which persists.
- For each exercise:
 - move smoothly and slowly, without sudden jerks. The key is precision and control.
 - keep your mouth and jaw relaxed. Keep lips together, teeth slightly apart and let your tongue rest on the roof of your mouth.
 - gently hold your shoulders back and down so that they are relaxed while doing all exercises (see posture correction exercise, exercise 4, below).
 - in movement exercises, try to move the same distance to each side. If one side is stiffer, move gently into the stiffness. Move to that direction a little more often.
 - expect some discomfort, but remember exercises should not cause severe pain.

Neck exercises lying down

Lie down with a soft pillow under your neck, and with your knees bent up.

The chin nod exercise

Gently and slowly nod your head forward as if to say 'yes'. Feel the muscles at the front of your neck. Stop the nodding action just before you feel the front muscles hardening. Hold the nod position for five seconds and then relax. Gently move your head back to the normal start position. Repeat up to 10 times.

Head rotation

Gently turn your head from one side to the other. Look where you are going. Progressively aim to turn your head far enough so your chin is in line with your shoulder and you can see the wall in line with your shoulder. Repeat 10 times to each side.

Shoulder blade exercise

This exercise will relax and ease any tension in the muscles on top of your shoulders. It will give you pain relief.

Lie on your left side with your arm resting up on two pillows

Roll your right shoulder blade back and across your ribs towards the centre of your back. Hold the position for 10 seconds. Repeat 5 times

Repeat lying on the right side for the left shoulder blade.

Exercises while sitting**Correct postural position**

Correct your posture regularly by gently straightening up your lower back and pelvis (sit tall). Now gently draw your shoulder blades back and down (women towards their bra clip). Gently tuck your chin in. Hold the position with ease for at least 10 seconds. This position will prevent and ease muscle pain and tension in your neck and shoulder muscles. Repeat the correction regularly, every half hour during the day. You can do this exercise at work, in the car, train or bus and sitting at home.

Neck retraction

Sit in the correct postural position as shown in exercise 4 above. Gently draw your head back, sliding your chin back horizontally and keeping your nose pointing straight ahead. You should feel the retraction movement at the base of your neck and your neck should stay long. Repeat this 10 times every hour when sitting.

Neck movement exercises

Sit in the correct postural position as described in exercise 3. Repeat all exercises below 10 times to each side.

Rotation: gently turn your head from one side to the other. Look where you are going, progressively aim to see the wall in line with your shoulder. This exercise is similar to the one you did lying down. This time you do it sitting.

Side bending: gently tilt your head towards your shoulder and feel the gentle stretch in the muscles on the side of your neck. Perform the movement to both sides.

Bending and extension: gently bend your head towards your chest. Lead the movement with your chin. Moving the chin first, bring your head back to the upright position and gently roll it back to look up towards the ceiling. Leading with your chin, return your head to the upright position.

Neck strengthening exercises (isometric, no movement exercise)

Neck strengthening exercises should only be started later in your recovery. If unsure when to begin this, ask your treating health professional.

Sit in the correct postural position as described above. Make sure your chin is relaxed and slightly down. Place your right hand on your right cheek. Gently try to turn your head into your fingers to look over your right shoulder but allow no movement. Hold the contraction for five seconds. Use a 10% to 20% effort, no more! Repeat with the left hand on the left cheek. Do five repetitions of the holding exercise to each side.

Neck strengthening exercises whilst 4-point kneeling

Safe 4-point kneeling position. Begin by ensuring your knees are directly under your hips, and your hands under your shoulders. Your low back should be in a neutral position, that is, with a natural arch. Gently draw your belly button to your spine (10% effort). Push gently through your shoulder blades, so that your upper back is level. Draw your shoulders gently away from your ears, or toward your hips. Lift your head up so that it is level with your shoulders, but maintaining a gentle chin tucked or nod position.

Once you can hold the safe 4-point kneeling position, then proceed with the neck movement exercises as described below:

Neck bending and extension in 4-point kneeling

Adopt the safe 4-point kneeling position. Slowly look up toward the ceiling as far as you can go. Hold for 5-10 seconds. Follow this by slowly bending your neck, leading the movement with a chin tuck or nodding action. Continue the neck bending movement as far as possible, aim for your chin to touch your chest. Throughout this movement you should hold the neutral lower back and shoulder blade posture described above. Perform 5-10 repetitions.

Neck rotation in 4-point kneeling

Adopt the safe 4-point kneeling position. Slowly rotate (turn your neck to one side). It is important to maintain the gentle chin tuck or 'nod' position throughout the movement. Also, make sure your head stays level with your body, and does not drop down. If you do this exercise correctly, you should be looking over your shoulder at the end of the movement. It helps to do this exercise side on to a mirror so that you can check your head position. Repeat to the other side. Perform 5-10 repetitions.

Appendix 7: Outline of a cognitive behavioural approach

(The information in this section is based on information from the Victorian WorkCover Authority¹⁰⁴ and Stewart et al.⁹⁰)

Cognitive Behavioural Therapy (CBT) is a method of therapy that aims to help people become aware of, and modify, their unhelpful or unwanted reactions, beliefs and cognitions, and learn a new way of reacting.

CBT is based on the idea that the way we think (our thoughts and beliefs) can influence, and are influenced by, the way we feel (emotions) and how we act (behaviour). For instance, some people with whiplash may have unhelpful beliefs (thoughts) about movement, pain or re-injury that contribute to their fears (emotion). These beliefs may prevent the person from taking actions (behaviour) that will assist their recovery, such as undertaking light activity.

Examples of such beliefs may be:

Fear-avoidance: *“Increased pain means I’ve made my injury worse, so I must avoid any activity that aggravates my pain”*

Catastrophising: *‘I cant cope with this.... I will never get better’*

One aim of this therapy is to improve the persons’ awareness of their unhelpful or maladaptive thoughts and beliefs, and learn to modify or change these where appropriate. This is often achieved by a combination of cognitive re-evaluation techniques, and ‘pacing’.

Cognitive re-evaluation involves a range of strategies to help the person test the accuracy of their thoughts, and generate alternative beliefs that are more flexible. Pacing involves gradually increasing activities over time, and aims to help the person maintain a fairly even level of activity over the day, rather than doing a lot when pain is absent, and little or nothing when pain is aggravated.

In the context of managing pain, a CBT approach includes:

- Cognitive re-evaluation techniques (including problem solving)
- Reminders to check for unhelpful thinking patterns (e.g. catastrophising)
- Setting challenging yet obtainable goals
- Modification of daily activities with limited use of rest (pacing)
- Awareness of stress triggers and using coping strategies to avoid escalation of stress
- Applied relaxation
- Physical exercise

To be effective, CBT should be provided by a health professional trained in this form of therapy.

ABBREVIATIONS AND ACRONYMS

CBT	Cognitive Behavioural Therapy
CI	Confidence Interval
CSQ	Coping Strategies Questionnaire
CSQ-CAT	Coping Strategies Questionnaire - Catastrophising Subscale
CT	Computed Tomography
EEG	Electroencephalography
EMG	Electromyography
GAR	Guideline Assessment Register
GHQ	General Health Questionnaire
GPs	General Practitioner(s)
HQ	High Quality
IES	Impact of Event Scale
K10	Kessler Psychological Distress Scale
MAA	Motor Accidents Authority
MQ	Moderate Quality
MRI	Magnetic Resonance Imaging
MVA	Motor Vehicle Accident
MVC	Motor Vehicle Collision
NDI	Neck Disability Index
NHMRC	National Health and Medical Research Council
NSAIDs	Non-Steroidal Anti-Inflammatory Drug(s)
PEMT	Pulsed Electromagnetic Treatment
QTF	Quebec Task Force
QUOROM	Quality of Reporting of Meta-Analyses
RCT	Randomised Controlled Trial
ROM	Range of Movement
SD	Standard Deviation
SES	Self Efficacy Scale
SF36	Short Form 36 Health Survey
TAG	Technical Advisory Group
TENS	Transcutaneous Electrical Nerve Stimulator

VAS	Visual Analogue Scale
WAD	Whiplash-associated disorders

GLOSSARY

Adverse prognostic indicators	Factors that have been associated with adverse outcomes
Cervical pillows	Commercially made contoured pillows
Consensus	Majority view of all members of the Working Party. The basis for recommendations in the absence of evidence
Exercise	May be either a direction to increase activity or a prescription for a specific set of exercises
Immobilisation	To prevent motion of the neck usually by application of a cervical collar
Manipulation	A technique of treatment applied to joints for the relief of pain and improvement of motion. It is a single high velocity, low amplitude movement applied passively to the joint towards the limit of its available range
Manual and physical therapies	Methods of treatment (e.g. manipulative and exercise therapy) used in the rehabilitation of persons with musculoskeletal disorders. They are non-invasive, non-pharmaceutical methods of treatment.
Miscellaneous interventions not otherwise defined	A set of complementary health treatments identified in the QTF guidelines not addressed separately
Passive joint mobilisation	A technique of treatment applied to joints for the relief of pain and improvement of motion. Mobilisation is the passive application of repetitive, rhythmical, low velocity, small amplitude movements to the joint within or at the end of range.
Multi-disciplinary pain team	A group of health care providers capable of assessing and treating the physical, psychological, medical, vocational and social aspects of patients with chronic pain. The health care team should hold regular meetings concerning individual treatment outcomes and evaluate overall program effectiveness.
Multimodal treatment	Management that includes concurrent application of several different treatment modalities including relaxation training, manual and physical therapies, exercise, postural training and psychological support.
Ongoing evidence of benefit	Defined as a change in Pain VAS and NDI (at least 10% improvement).
Passive modalities	Those electrotherapeutic agents that are applied for such purposes as the relief of pain and assisting the resolution of the inflammatory response. They are administered passively to the patient
Postural advice	Specific instructions on posture
Prescribed function	Recommendation of specific activity, eg walking
Prescribed rest	Recommendation of 'rest' that may include avoidance of some activities of daily living
Radicular irritation	Symptoms caused by irritation of the nerve root

Relaxation	Techniques used to reduce muscle tension and anxiety
Soft collars	Foam neck supports
Specialised examinations	Specialised tests that are not routinely performed as part of physical examination and that often require specialised testing equipment
Specialised imaging techniques	All radiological techniques except plain film radiology
Spray and stretch	Techniques where a coolant spray is applied to a painful area as a precursor to stretching
TENS	Transcutaneous electrical nerve stimulation is a non-invasive low frequency electrical stimulation, which is applied through the skin with the aim of introducing an afferent barrage to decrease the perception of pain
Traction	A passive, longitudinal force of a vertebral segment that can be applied manually or mechanically with the aim of inducing subtle vertebral distraction for duration of the procedure
Whiplash-Associated Disorders (WAD)	Whiplash is an acceleration-deceleration mechanism of energy transfer to the neck. It may result from “...motor vehicle collisions...” The impact may result in bony or soft tissue injuries, which in turn may lead to a variety of clinical manifestations
Work alteration	Modification of work duties and/or environment to accommodate an injured worker

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