

GUIDELINES

for the Management of Acute Whiplash-Associated
Disorders for Health Professionals

2nd Edition 2007



**MOTOR ACCIDENTS
AUTHORITY**

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The Motor Accidents Authority (MAA) has developed new guidelines for the management of Whiplash-Associated Disorders (WAD), the single most frequently recorded injury among compulsory third party (CTP) claimants in NSW. These guidelines provide recommendations to health practitioners, insurers and patients alike for the best possible management of adults with acute WAD in the first 12 weeks following a motor vehicle accident (MVA).

In 2001, the MAA developed the first edition of the guidelines (1). They were based on an update of the Quebec Task Force (QTF) guidelines, released in 1995 (2) that reviewed 10,000 publications and 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 who were drawn from many clinical fields.

This second edition of the guidelines significantly builds on the first edition. A comprehensive review was undertaken using the MAA 2001 WAD guidelines as a starting point. The aim was to systematically review and summarise relevant literature from 1999 to November 2005 on the assessment and diagnosis of WAD, the prognosis of WAD and the effectiveness of treatment in subjects with acute and subacute (less than 12 weeks duration) whiplash. A concerted attempt was also made to objectively assess the quality of the collected studies so the best possible decisions regarding management could be made. A complete guide to the methodology used can be found in the accompanying Technical Report.

The review of prognostic factors identified studies showing that pain and disability persist in a majority of people with WAD at three months post-injury and remain in a significant number of people at six and 12 months after injury. Hence, the aim of assessment and treatment is to relieve pain and restore function and to identify factors that may be associated with slower recovery. A positive approach is needed; however, for many people with whiplash it is not possible to abolish all symptoms within the 12 week time frame covered by these guidelines.

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

These guidelines cover the first 12 weeks following a MVA; however, they recognise that the natural course of the condition can go beyond the acute phase addressed here. Clinical utility has been uppermost in the minds of the team working on this project. The MAA hopes that the guidelines will be useful to primary care practitioners, consumers and the insurance industry.

Purpose of the guidelines

These guidelines are intended to assist health professionals delivering primary care to adults with acute or subacute simple neck pain after a MVA, in the context of CTP insurance

Definition

The QTF definition of WAD has been adopted for the purposes of these guidelines.

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 (whiplash injury), which in turn may lead to a variety of clinical manifestations (Whiplash-Associated Disorders).

Grades of WAD

The clinical classification of grades of WAD provided by the QTF is shown in the table below. Symptoms and disorders that can be manifest in all grades include deafness, dizziness, tinnitus, headache, memory loss, dysphagia and temporomandibular joint pain.

Scope

The scope of the guidelines covers WAD Grades I, II and III following a MVA. Grade IV is only considered to the extent of diagnosis of the condition and immediate referral to an Emergency Department or appropriate medical specialist. **These guidelines are applicable in the first 12 weeks after a MVA when WAD is the only injury or when it has occurred concurrently with other injuries.**

Table 1. Quebec Task Force Classification of Grades of WAD

Grade	Classification
0	No complaint about the neck. No physical sign(s).
I	Complaint of neck pain, stiffness or tenderness only. No physical sign(s).
II	Neck complaint AND musculoskeletal sign(s). Musculoskeletal signs include decreased range of movement 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.

➤ When to consult the guidelines

The guidelines are relevant when an adult experiencing neck pain after a recent MVA consults their general practitioner or health professional. They apply when:

- ▶ taking a patient history;
- ▶ conducting an examination;
- ▶ determining what, if any, investigations are required; and
- ▶ treating or referring a patient for treatment from other health professionals, such as physiotherapists and chiropractors.

In many cases, recovery from WAD occurs quickly. However, some people with WAD will have symptoms that persist beyond 12 weeks. To deal with more complex cases the guidelines offer 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; and
- ▶ providing indications of when referral to specialists or a multidisciplinary pain team or rehabilitation providers should be considered.

➤ Target audience and products

The guidelines are relevant for general practitioners and other health professionals involved in primary care in NSW, e.g., physiotherapists, chiropractors and osteopaths. An Insurer's Guide and a Guide for Consumers have also been developed. A technical report containing the tables of evidence and a detailed description of the methodology used to develop this edition has also been prepared.

A more detailed account of the methodology is provided in the Technical Report.

The methodology was guided by National Health and Medical Research Council (NHMRC) recommendations for the development of clinical practice guidelines.

The MAA WAD guidelines published in 2001 were used as the starting point for the current review. The 2001 guidelines, in turn, were based on findings from the QTF on WAD (1995) and a further limited literature review examining new evidence since the publication of the QTF's findings in 1995. The 2001 guidelines also relied on the consensus opinion of the Working Party and expert opinion where objective evidence was inconsistent or lacking.

The aim of the current review was to comprehensively search for, identify and analyse new evidence regarding the management of whiplash since the 2001 review. The quality of the new evidence was examined and the necessary refinements made to the existing guidelines. The Working Party identified three key areas for review: assessment and diagnosis, prognosis, and evidence of treatment efficacy. Each of these areas was reviewed separately.

A comprehensive search of appropriate electronic databases from 1999 to November 2005 was conducted using defined eligibility criteria for each of the three key areas. 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 whether any major studies had been missed. Summary tables were constructed that outline the details of included studies and their results. Written recommendations were made based on these results. Where appropriate the quality of each study was rated. These tables and recommendations were presented to the Technical Working Party. This group examined the findings of the review process and discussed any modifications to the proposed guidelines. Recommendations were presented to the full Working Party 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 primary difficulties in diagnosing whiplash is that whiplash essentially describes a mechanism of injury. 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). This system has helped guide the assessment and diagnosis of WAD over the past decade. It is important that clinicians can identify signs and symptoms indicative of the various levels of severity of WAD so appropriate management can be undertaken.

The aim of this section was to improve the assessment of patients with whiplash. More specifically, the review aimed to evaluate appropriate tests or markers that are important in diagnosing and classifying people with acute WAD and to identify any procedures or markers that help differentiate patients with WAD from other populations (such as asymptomatic patients, or patients with neck pain of non-traumatic origin). A further aim of any assessment is to identify individuals with a good versus a poor prognosis. The results of the review of reports on the assessment and diagnosis of WAD were therefore combined with the results of the review of reports on the prognosis of WAD (see below) to ensure that the section on the assessment of WAD was as complete as possible.

➤ Prognosis

Since the publication of the first edition of these guidelines Scholten-Peeters et al (3) have published a major systematic review on the prognosis of WAD. This high-quality review was used as the basis of the review prepared for the current report. The primary author of this work (Scholten-Peeters) was contacted and consented to the use of the work for this purpose. The checklist proposed by Scholten-Peeters et al (3) was used to assess the methodological quality of the papers. Details of any additional studies, their results and quality scores were combined with the results of Scholten-Peeters et al (3).

➤ Treatment

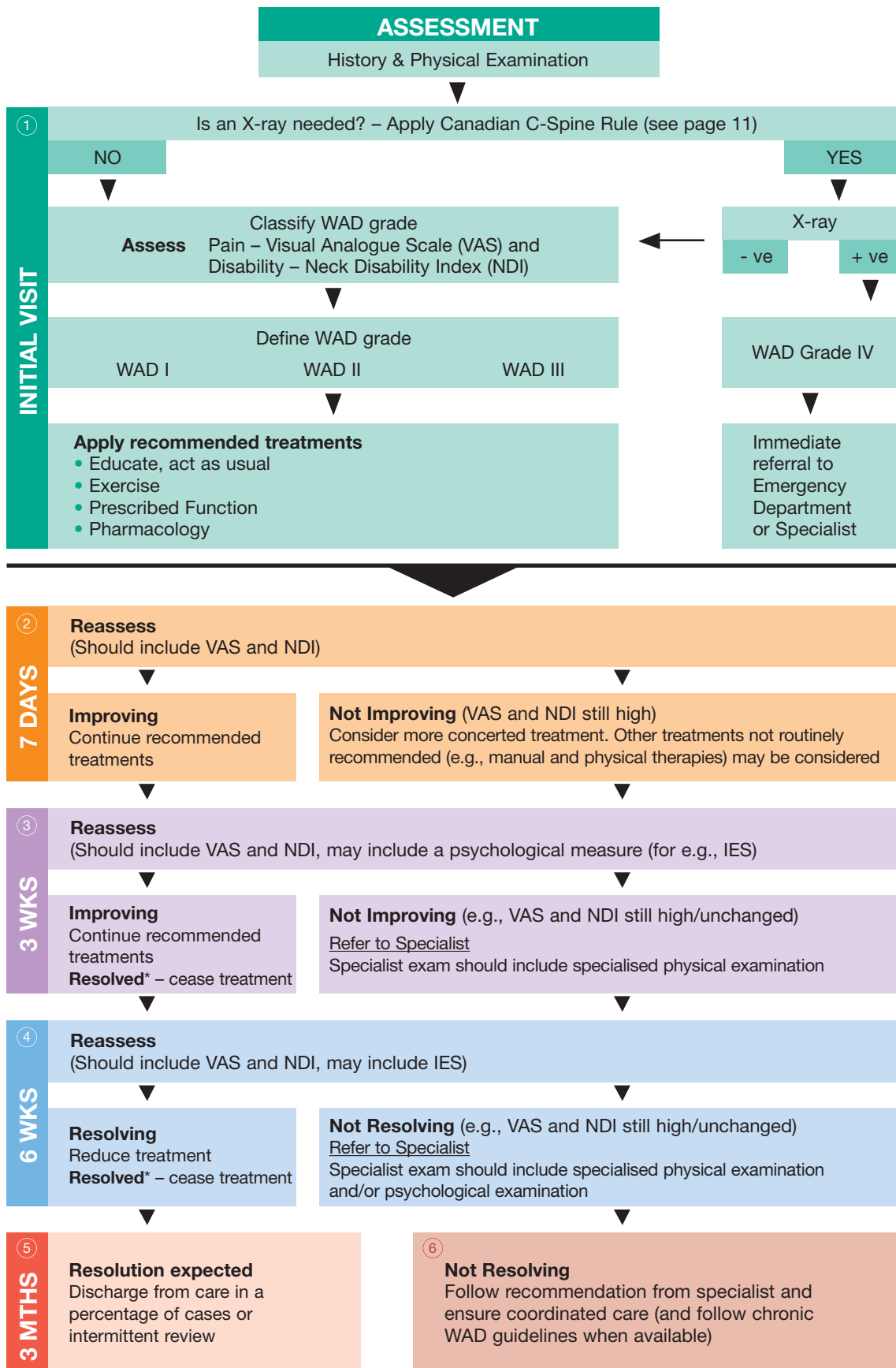
Randomised controlled trials (RCTs) were assessed for methodological quality using the PEDro scale (4). Systematic reviews were scored for methodological quality using a modified QUORUM guidelines (5) checklist.

➤ Review of the draft revised WAD clinical guidelines

The draft clinical guidelines were distributed to a range of medical and health organisations and individuals for comment.

Early management flowchart

Early management of Whiplash-Associated Disorders



*Resolution is defined as VAS <= 3/10 and NDI < 8/50

Notes to the flowchart

The flowchart provides a structure for the assessment and treatment of people with WAD during the first 12 weeks following injury. A glossary is available on page 35 to assist with interpretation of technical terms and abbreviations. 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.

Initial assessment 1

Classify the WAD grade according to the QTF definition. Although higher WAD grades indicate greater severity, poor prognosis is most likely to be associated with a high Visual Analogue Scale (VAS) pain score (> 7/10) or high Neck Disability Index (NDI) score (> 20/50). Copies of the VAS and NDI and how to score them accompany this guide (see Appendix 3). The Working Party recommends assessing the VAS scale and the NDI at initial assessment (preferred) or at the seven day review (see below) to identify WAD patients at risk of nonrecovery.

Apply recommended treatments.

Review

Primary care practitioners should review patients regularly, at least at the following intervals: seven days, three weeks, six weeks and three months. Review should include reassessment of the VAS and the NDI. Improvement is considered at least a 10% change on these scales.

Seven day reassessment 2

Reassess, including the VAS and NDI. If the VAS and NDI are high or unchanged, treatment type and intensity should be reviewed. Other treatments listed in this guide as 'not routinely recommended' may be considered. This may involve referral for physical or manual therapy. The effectiveness of such treatments should be closely monitored and only continued if there is evidence of benefit (at least 10% change in VAS and NDI).

Three week reassessment 3

Reassess, including the VAS and NDI. If the VAS and NDI are unchanged, a more complex assessment may need to be considered and treatment type and intensity should again be reviewed. The Impact of Event Scale (IES); (see Appendix 3) may be used as a baseline for psychological assessment. However, other recommended scales in these guidelines can be used. If the VAS and NDI are unchanged, consider referral to a specialist in WAD.

A specialist is considered to be a practitioner with specialised expertise in the management of WAD.

These may include rehabilitation physicians, pain medicine specialists and occupational physicians who specialise in WAD. Equally, specialist physiotherapists or musculoskeletal medicine practitioners who specialise in WAD can be considered. Amongst other things, if the VAS and NDI are unchanged, the specialist should undertake a more complex physical and/or psychological examination. They should direct more appropriate care and liaise with the treating practitioner to ensure this is implemented. If the symptoms are resolving treatment should be reduced.

Six week reassessment 4

Reassess again at this point. In at least 40% of cases resolution should be occurring, and the process of reducing treatment in these cases should commence or continue. If resolution is not occurring and the VAS and NDI have not changed by at least 10% from the last review, specialist care should still be followed, or a specialist should be referred to if this has not already been done. At this point, referral to a clinical psychologist should also be considered if the psychological assessment data are markedly below norms (for the IES this means a score of > 26 at the six week reassessment interval).

Three month reassessment 5

Resolution should have occurred in at least 40% of cases. In these cases treatment should be ceased. If the patient is still improving, continue treatment; however, independence should be promoted (e.g., focus on active exercise). In these resolving cases, the patient should be reviewed intermittently over the next six to 12 months until resolution, to ensure home programs are maintaining improvement.

Coordinated care 6

Patients whose VAS and/or NDI scores are not improving at this point are likely to require coordinated care that is multidisciplinary. It is likely that a combination of physical, psychological and medical care is required. The primary practitioner should facilitate this process.

Recommendations for Clinical Practice

The recommendations for clinical practice are presented for assessment, prognosis and treatment of WAD, with the original MAA recommendations from 2001 and an explanation of any change to the 2001 recommendations.

Additional evidence found by the literature review conducted on research published between 1999 to November 2005, has been summarised and the level of evidence provided by this research has been rated. Rating scales used to determine the level of evidence for recommendations are described in Appendix 4.

The Technical Report provides further details of these studies and a complete bibliography. Prognostic indicators for whiplash are summarised in Table 2 on page 20. Changes to previous recommendations about the treatment of whiplash are summarised in Table 3 on page 32.

➤ Taking patient history

2007 recommendations

Taking a patient's history is important during all visits for the treatment of patients with WAD of all grades.

A patient's history should include information about:

- ▶ date of birth, sex and education level;
- ▶ circumstances of injury, such as relevant crash factors that are related to the Canadian C-Spine Rule (see page 11);
- ▶ symptoms, particularly including pain intensity (ideally, using the Visual Analogue Scale (VAS) or similar). Stiffness, numbness, weakness and associated extra cervical symptoms; localisation, time of onset and profile of onset should also be recorded for all symptoms;
- ▶ disability level, preferably using the Neck Disability Index (NDI). Other scales such as the Functional Rating Index, Patient-Specific Functional Scale, Core Whiplash Outcome Measure, or similar, may also be used (see Appendix 3). Such an assessment should be conducted on a patient's second visit at seven days, if not initially; and
- ▶ prior history of neck problems including previous whiplash injury.

Where appropriate, further assessment to determine psychological status may be undertaken at the three or six week review. The preferred tool is the Impact of Event Scale (IES), which is a validated tool. Other scales may be useful in some circumstances (see Technical Report for details).

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

➤ Physical examination

2007 recommendations

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 range of movement (ROM) including flexion (chin to chest), extension, rotation and lateral flexion;
- ▶ neurological testing;
- ▶ assessment of associated injuries; and
- ▶ assessment of general medical condition(s), including psychological state (as appropriate).

A further, more specialised, physical examination assessment might include:

- ▶ assessment of joint position error;
- ▶ assessment of superficial neck flexor muscle activity; and
- ▶ an assessment of widespread sensitivity (this may include cold sensitivity, pressure pain threshold, and/or the brachial plexus provocation test).

Tools, such as a universal goniometer or inclinometer, can be used to measure neck ROM, and are more reliable than observation. A standardised form may be used.

2001 guidelines

Recommendations for taking a patient's history and physical examination of a patient in the previous review were based on the original QTF guidelines. The QTF recommendations were based on the consensus opinion of the taskforce. No accepted studies that dealt with the value of history taking or physical examination for the positive diagnosis of WAD were found by the QTF.

No additional studies that dealt with the value of history taking for the positive diagnosis of WAD were included in the 2001 guidelines. Evidence from cohort studies that considered history and physical examination techniques to help determine prognostic indicators of delayed/poor recovery were used to modify the original QTF recommendations.

New evidence since 2001

Three studies (6, 7, 8) that dealt with the value of history taking and physical examination for the positive diagnosis of WAD were identified. The findings were as follows:

- ▶ measurement of pain and cervical ROM may predict handicap following a whiplash injury (sensitivity 73%, specificity 91%) (6);
- ▶ whiplash injury induces changes in motor function (decreased ROM, increased joint position error, increased electromyographic (EMG) activity of the superficial neck flexors) and psychological distress (7);
- ▶ widespread hypersensitivity is a characteristic of moderate/severe WAD Grades II–III (7); and
- ▶ pain is the most common complaint in whiplash (8) and further ROM measurements (chin to chest) may differentiate more and less severe grades of whiplash.

A number of cohort studies were identified in the review of reports on the prognosis of WAD that are relevant to history taking and physical examination. The results of the prognosis review may be seen in the next section and the Technical Report. To summarise the main findings:

- ▶ high initial pain levels and high initial disability levels are indicative of a poor prognosis; and
- ▶ limited education level and hypersensitivity to cold stimuli are additional indicators of a poor prognosis in terms of ongoing disability.

Basis for change

The findings of the three studies noted above have been included in the recommendations. There is an increasing body of evidence to support that acute whiplash, in addition to restriction of ROM and tenderness, is characterised by overactivity in the superficial cervical flexor muscles, joint position error and, in some cases, widespread hypersensitivity. Specialised assessment of these deficits may aid diagnosis and treatment and have therefore been added in a specialised assessment section.

Because high initial pain levels and high initial disability have been associated with poor prognosis, an assessment of these factors using validated tools such as the VAS pain scale, NDI or similar, should be included in any assessment.

There has been further validation of a number of tools used to measure pain, disability, general well-being and psychological factors since the previous review. It was the consensus of the Working Party that these validated tools should be used in the assessment of WAD.

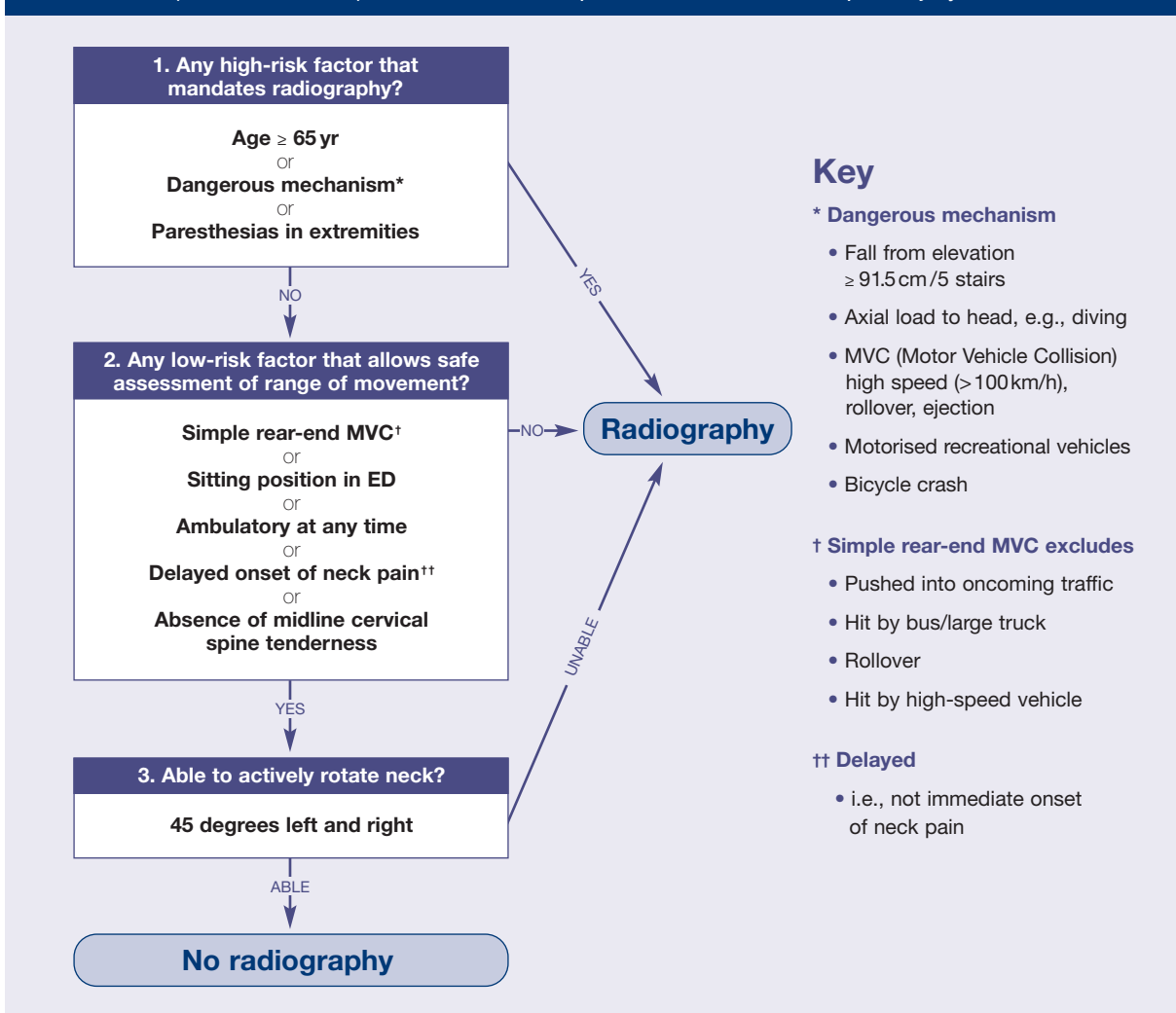
Plain radiographs

2007 recommendations

The Canadian C-Spine Rule (9), shown in the flowchart below, should be used to decide whether X-ray of the cervical spine is required. If there is concern about trauma to the cervical spine and the patient is alert (Glasgow Coma Score 15/15) and stable, the following flowchart should be used.

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 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 the low risk factors shown in the QTF Classification of Grades of WAD (Table 1). If people are able to rotate to 45 degrees they do not require an X-ray of the neck.

This rule has been validated across several different populations and has been shown to have a sensitivity of 99.4% and specificity of 42.5%. Essentially physicians who follow this rule can be assured that a fracture will not be missed (95%CI 98-100%).

2001 guidelines

In the 2001 guidelines, a request for plain radiographs was made based on the WAD Grade of the individual. This was largely based on QTF findings with the addition of two observational studies and consensus judgement.

New evidence since 2001

The Canadian C-Spine Rule has been validated since 2001. It incorporates some of the information included in the previous guidelines that was consensus based.

Basis for change

The Canadian C-Spine Rule is well validated. It is used extensively in New South Wales Emergency Departments (A Joseph, personal communication), and it has greater validity than the previous recommendation.

Specialised imaging techniques

2007 recommendations

WAD Grades I and II

There is no role for specialised imaging techniques (e.g., tomography, computed scan (CT), magnetic resonance imaging (MRI), myelography, discography, etc.) in WAD Grades I and II.

WAD Grade III

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

2001 guidelines

No change is recommended. Based on consensus of the Working Party.

New evidence since 2001

The retrospective cohort study by Ovadia et al (8), found no significant correlation between clinical findings, imaging and EMG, and no correlation was found between CT and MRI findings and complaints of radicular pain. They stated that CT and MRI did not add to the diagnosis (except where there were degenerative changes and decreased ROM). These

researchers concluded that X-ray was the best imaging modality and the only one routinely required following whiplash injury.

Steinberg et al (10), in a retrospective cohort study, found no correlation between CT, MRI and EMG findings.

These studies suggest that investigations additional to plain radiography, such as those using CT or MRI, are not reliable in diagnosing WAD.

Basis for change

No change is recommended. The additional evidence supports the 2001 recommendations.

➡ Specialised examinations

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

2007 recommendations

WAD Grades I and II

There is no role for specialised examination techniques (e.g., EEG, EMG and specialised peripheral neurological tests) in patients with WAD Grades I or II.

WAD Grade III

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

2001 guidelines

The 2001 guidelines were based on consensus of the Working Party, with reference to limited QTF recommendations

study found that assessment of markers in cerebrospinal fluid may assist in quantifying the degree of nerve cell damage in spinal cord injury. Such a test would only be relevant in selected patients with WAD Grade IV.

New evidence since 2001

Steinberg et al (10) found that there was no correlation between patient symptoms, objective findings on clinical examination and EMG. One

Basis for change

The changes made to the previous guidelines were based on the consensus of the Working Party.

Symptoms

2007 recommendations

Poor outcomes¹ following whiplash are associated with high initial:

- ▶ **pain intensity (e.g., pain > 7/10 on VAS scale); and**
- ▶ **disability (e.g., NDI > 20/50).**

The presence of either of these two factors should alert the practitioner to the potential need for more intensive treatment or earlier referral.

2001 guidelines

Previous guidelines were based on Grade III-2 evidence and found that poor outcomes were associated with:

- ▶ severity of neck symptoms and radicular irritation at initial assessment;
- ▶ presence of specific symptoms such as headache, muscle pain, pain or numbness radiating from neck to arms, hands or shoulders;
- ▶ initial injury reaction (sleep disturbance, nervousness); and
- ▶ more initial subjective complaints and concern regarding long-term prognosis.

New evidence since 2001

Since the 2001 review was completed a high quality² systematic review has been published by Scholten-Peeters et al (3). Using this review as a base, a further systematic review of all prognostic studies was conducted. Studies were rated for quality and those of high quality were added to the findings of Scholten-Peeters et al. Each of the sections below draws on the findings from this newly acquired high-quality evidence.

There was strong evidence (eight of 10 high-quality studies) that high initial pain intensity was associated with ongoing pain symptoms and moderate evidence (3/4 high-quality studies) that high initial pain intensity was associated with ongoing disability. There was further strong evidence that high initial disability is associated with ongoing pain symptoms (3/4 high-quality studies) and ongoing disability (5/6 high-quality studies).

Basis for change

Changes made to the previous guidelines were based on strong additional evidence.

Radiological findings

2007 recommendations

There is strong evidence that degenerative changes on X-ray are not associated with ongoing pain symptoms following whiplash.

2001 guidelines

The previous guidelines were based on one study, which showed that poor outcome may be associated with pre-existing osteoarthritis on an initial cervical radiograph (Level IV evidence).

New evidence since 2001

There is strong additional evidence (12/15 high-quality studies) that X-ray changes are not associated with poor outcome (ongoing pain symptoms) following whiplash.

Basis for change

The previous guidelines were altered on the basis of new evidence since previous review.

1. Outcomes are defined as

- ongoing pain symptoms; or
- ongoing disability. Ongoing disability is defined differently in different studies, and may include high scores on disability questionnaires, or non-participation at work.

2. Definitions of quality and strength of evidence are given in the Technical Report.

Psychosocial factors

2007 recommendations

The relevance of psychosocial factors in predicting outcome in whiplash is inconclusive. Poor prognosis is most likely to be associated with high initial pain intensity and high initial disability. However, where appropriate, psychosocial health may be assessed (preferably using the IES; see Appendix 3). If the IES score is greater than 26 (at six weeks after injury) psychological referral may be indicated.

2001 guidelines

The 2001 recommendations were based on the consensus of the Working Party.

New evidence since 2001

There were six studies identified in the Scholten-Peeters review (3) that related to high acute psychological response in individuals with WAD. Of these, five studies were not associated with ongoing pain symptoms. The review for this report found a further nine studies, of which six were associated with ongoing pain symptoms and three were not. Hence, the pooled results revealed that eight of 15 studies that investigated acute psychological response were not associated with ongoing pain symptoms, and seven of 15 high-quality studies were associated with ongoing pain symptoms. Therefore, the evidence regarding psychosocial factors in predicting outcome is contradictory and inconclusive.

Each study used different scales to measure psychological health showing that tools that are potentially useful in predicting outcome are not easily identified by adopting this review process. Therefore, each of the scales that were associated with poor outcome were further reviewed to assist in making a recommendation. This process established that the IES (as a measure of symptoms of post traumatic stress (13)) is a widely available scale that can be used in this setting.

The short form 36 (SF36) health survey questionnaire has been associated with poor prognosis in terms of ongoing pain (11) and ongoing disability (12). Furthermore, the results of the SF36 for patients with WAD can also be compared with results for the normal population. However, it is not recommended as the first tool to use to assess psychological health because it is complex to score and a license is necessary to use it.

Other tools that could be used and are also associated with poor prognosis are reviewed in the Technical Report.

Basis for change

Changes made to the guidelines reflect new evidence since the previous review.

Sociodemographic factors

2007 recommendations

There is strong evidence that poor outcome (ongoing disability) is associated with a limited educational level.

There is strong evidence that poor outcome (ongoing pain) is not associated with age (up to 65 years), sex or marital status.

The evidence associating employment status with poor outcomes (ongoing pain symptoms) is inconclusive.

2001 guidelines

The 2001 guidelines were based on the consensus of the Working Party and Grade III-2 evidence.

New evidence since 2001

Strong new evidence shows that a limited education level is associated with poor outcome related to disability (2/2 of high-quality studies). Furthermore, there is strong new evidence that age is not associated with poor outcome (25/30 high-quality studies related to ongoing pain

symptoms and 9/12 high-quality studies related to ongoing disability). The maximum age of people included in studies was generally 65 years.

There is also strong evidence that marital status is not associated with poor outcome (3/3 of high-quality studies related to ongoing pain symptoms, and 2/2 of high-quality studies related to ongoing disability).

The evidence regarding employment status is inconclusive because one study found it is associated with poor outcome (ongoing symptoms) and the other did not.

There was also new evidence that sex is not associated with poor outcomes (25/29 high-quality studies related to ongoing pain symptoms – strong evidence; and 8/11 of high-quality studies related to ongoing disability – moderate evidence).

Basis for change

Changes made to the guidelines reflect the new evidence since the previous review.

Crash-related factors

2007 recommendations

The relevance of crash-related factors in predicting outcome in whiplash is inconclusive.

2001 guidelines

The 2001 guidelines noted two studies that dealt with crash-related factors and prognosis following whiplash. These studies identified that non-recovery of patients was associated with:

- ▶ head rotated or inclined at time of impact;
- ▶ occupancy in truck/bus; and
- ▶ being in a head-on or perpendicular collision.

New evidence since 2001

There is strong evidence that crash factors, including position in the vehicle and crash type (2/2 studies), are not associated with poor outcome (ongoing disability).

However, the findings of the Scholten-Peeters review (3) and the current review differ in regard to the association of crash-related factors with poor

prognosis in terms of ongoing pain symptoms. Scholten-Peeters found limited evidence that an accident on the highway (one high quality study), a car being stationary when hit in the rear-end (one high quality study) and the presence of female passengers (one high quality study) were associated with ongoing pain symptoms.

However, Scholten-Peeters also found that there was strong evidence (12/14) that a rear-end accident of any type was not associated with ongoing pain symptoms. Similarly, the four additional studies included in this review all found strong evidence that crash-related factors, including circumstances of the collision, direction of impact and speed, were not associated with ongoing pain symptoms. The evidence for crash-related factors being involved in predicting outcomes in patients with WAD is therefore contradictory and inconclusive.

Basis for change

Changes made to the guidelines reflect new evidence since the previous review.

Physical impairment

2007 recommendations

Factors related to poor outcome (ongoing disability) include:

- ▶ hypersensitivity to specific cold sensitivity testing; and
- ▶ poor cervical ROM.

2001 guidelines

Physical factors were not considered in the previous guidelines.

New evidence since 2001

There is strong evidence that cold sensitivity (2/2 high-quality studies related to ongoing disability) is associated with poor outcomes in patients with WAD. There is strong evidence (3/3 high-quality studies related to ongoing disability) that reduced cervical ROM is associated with poor outcomes in patients with WAD. Factors such as the pressure pain threshold, increased EMG activity and body mass index are not associated with poor outcomes in patients with WAD.

Basis for change

Changes made to the guidelines reflect new evidence since the previous review.

Prior history/previous symptoms

2007 recommendations

There is moderate evidence that previous neck pain is not associated with poor outcomes in patients with WAD in terms of ongoing pain symptoms.

However, previous neck pain may be associated with poor outcome in terms of ongoing disability.

2001 guidelines

The 2001 guidelines cited evidence from one study that poor recovery after whiplash is associated with:

- ▶ history of pretraumatic headaches; and
- ▶ previous history of head injury.

New evidence since 2001

There is moderate evidence that previous injury and previous neck pain (7/9 of studies related to ongoing pain symptoms) are not associated with poor outcome following a whiplash injury. However, one high-quality study did find that previous neck pain is associated with ongoing disability.

Basis for change

Changes made to the guidelines reflect new evidence since the previous review.

Compensation

2007 recommendations

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

2001 guidelines

The previous guidelines included compensation under 'Sociodemographic factors'. Poor recovery in patients with WAD was found to be related to compensation in one study (14).

New evidence since 2001

Scholten-Peeters (3) found that compensation was not associated with poor outcome (ongoing pain symptoms; 6/7 high-quality studies). However, additional evidence published recently has resulted in changes being made to the Scholten-Peeters recommendation.

In an additional four of five studies, compensation was associated with poor outcome (ongoing pain symptoms). Factors considered in these studies included having a current claim, consulting a lawyer or having had a previous claim. The overall evidence for compensation factors associated with a poor outcome is therefore inconclusive (5/12 pooled studies were associated with ongoing pain symptoms).

Basis for change

Changes made to the guidelines reflect new evidence since the previous review.

High utilisation of treatment

2007 recommendations

The evidence that high utilisation of treatment predicts ongoing (pain) symptoms in patients with WAD is inconclusive, and evidence that high utilisation of treatment predicts ongoing disability in patients with WAD is limited.

2001 guidelines

The previous guidelines did not include high utilisation of treatment as a prognostic factor.

New evidence since 2001

Scholten-Peeters (3) found that high utilisation of treatment was associated with poor outcome (ongoing pain symptoms) in 60% (3/5) of high-quality studies. Therefore, the evidence was inconclusive. Two studies published since then also have contradictory findings. One study found

that treatment was associated with ongoing pain symptoms (12), and the other found that treatment was not associated with ongoing pain symptoms (15). Therefore, the overall evidence for treatment being associated with ongoing symptoms in patients with WAD is inconclusive (4/7 (57%) of the pooled studies were associated with poor outcomes or ongoing pain symptoms).

Another study (16) found that high utilisation of treatment was associated with ongoing disability. Because the outcome assessed was time-to-claim closure, and was obtained from one study, the evidence for high utilisation of treatment being associated with ongoing disability is limited.

Basis for change

Changes made to the guidelines reflect new evidence since the previous review.

Table 2 below summarises the prognostic indicators that are relevant to acute and sub-acute WAD (see Technical Report for further details).

Table 2. Summary of Prognostic Indicators for Acute and Sub-Acute Whiplash

Strength of evidence*	Ongoing pain symptoms	Ongoing disability
Factors associated with poor prognosis		
Strong evidence	• High initial pain intensity	• High initial disability
	• High initial disability	• Limited education
		• Cold sensitivity
		• Reduced cervical range of movement
Moderate evidence		• High initial pain intensity
Limited evidence		• Previous pain symptoms
		• Compensation factors
		• High utilisation of treatment
Inconclusive evidence	• Psychosocial factors	• Psychosocial factors
	• Educational level	
	• Crash factors	
	• Compensation factors	
	• Employment status	
	• High utilisation of treatment	
Factors found not to be associated with poor prognosis		
Strong evidence	• X-ray changes	• Age (< 65 years)
	• Age (< 65 years)	• Marital status
	• Sex	• Crash factors
	• Marital status	• Increased EMG activity on superficial muscles
Moderate evidence	• Previous pain symptoms	• Sex
Limited evidence		• Pressure Pain Threshold
		• Body Mass Index

*Strength of evidence is defined in the Technical Report (Table 5.2).

EMG – electromyographic

Recommended

Reassure, act as usual

2007 guidelines

The practitioner 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.

2001 guidelines

Reassure/act as usual were included in the 2001 guidelines on the basis of consensus of the Working Party. A RCT by Borchgrevink et al (17) supported the use of 'act as usual' advice plus self-training.

New evidence since 2001

Level I evidence, provided by three systematic reviews (18, 19, 20), concluded that education/advice to return to normal activities (including work tasks) and early mobilisation as quickly as possible were beneficial for the treatment of WAD.

Basis for change

Changes made to the guidelines were based on Level I evidence provided since the previous review.

Prescribed function, work alteration

2007 guidelines

Prescribed function (i.e., return to usual activity as soon as possible) is recommended. Rehabilitation programs, which may include alterations to an individual's work schedule, may assist recovery depending on symptoms (e.g., pain, ability to concentrate) and psychosocial factors.

New evidence since 2001

As mentioned above, Level I evidence was found to support that early return to normal activity and early mobilisation is beneficial in the treatment of WAD. No direct evidence exists regarding alterations to an individual's work commitments.

Basis for change

Level I evidence is available to support the early return to preinjury activity and early mobilisation. Consensus opinion of Working Party regarding alterations to an individual's work schedule.

2001 guidelines

Recommendations were included in 2001 guidelines on the basis of consensus of the Working Party.

continued over

Recommended (CONTINUED)

Exercise

2007 guidelines

ROM and muscle re-education exercises to restore appropriate muscle control and support to the cervical region in patients with WAD 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. A number of suitable exercises are listed in Appendix 6.

2001 guidelines

Recommendations included in the 2001 guidelines were on the basis of QTF recommendations and the consensus of the Working Party.

New evidence since 2001

Level I and II evidence (18, 19, 20, 21, 22, 23) supporting the use of active exercises and active exercises in combination with other therapy (e.g., McKenzie exercises) compared to rest and prolonged use of collar in patients with WAD.

Basis for change

New Level I and II evidence is available to support the use of active exercises and the use of active exercises in combination with other therapy to improve outcomes in patients with WAD.

Pharmacology

2007 guidelines

Details on pharmacology are found on page 23.

Not Routinely Recommended

Evidence for efficacy of interventions/treatment modalities listed in this section is either limited or does not exist. Therefore, treatments described in the 'recommended' section above are preferred. Practitioners who choose to use the 'not routinely recommended' treatments described below should closely monitor their effectiveness of these treatments in each patient. Treatment should only be continued if there is evidence of benefit (at least 10% change on VAS and NDI).

Pharmacology

Pharmacology includes simple analgesics / Nonsteroidal Anti-Inflammatory Drugs (NSAIDs).

2007 guidelines

WAD Grade I – no medication other than simple analgesics should be prescribed.

WAD Grades II and III – non-opioid analgesics and NSAIDs can be used to alleviate pain in the short term. Their use should be limited to three weeks and should be weighed up against known side-effects, which appear to be dose related.

Opioid analgesics are not recommended for patients with WAD Grade I. They may be prescribed for pain relief in patients with acute WAD Grades II and III experiencing severe pain (VAS > 8) for a limited period of time.

Muscle relaxants should not generally be used in patients with acute or subacute phase WAD.

Psychopharmacologic drugs are not recommended in patients with acute and subacute WAD of any grade. However, they can be used occasionally for symptoms such as insomnia or tension or as an adjunct to activating interventions in the acute phase.

Use of high-dose intravenous methylprednisolone infusion for acute management of patients with WAD Grades II and III is not recommended.

2001 guidelines

WAD Grade I – use of simple analgesics on the basis of consensus of the Working Party.

A RCT in which tenoxicam 20 mg (a NSAID) was given to patients with WAD Grades I and II within 72 hours of injury found that these patients had better ROM and less pain at 15 days post-injury compared with controls (24).

The Working Party considered that the use of high-dose intravenous methylprednisolone infusion could not be justified on the basis of one small RCT, given the potential adverse effects.

New evidence since 2001

No new evidence.

Basis for change

Changes were made based on the consensus of the Working Party.

Not Routinely Recommended (CONTINUED)

Postural advice

2007 guidelines

Postural advice should only be given in combination with manual and physical therapies and exercise, provided there is evidence of continuing measurable improvement.

2001 guidelines

Additional level II evidence (31) to QTF guidelines for the effect of physical modalities, ROM exercise, mobilisation and physiotherapist advice on posture and ROM exercise.

New evidence since 2001

No new evidence.

Basis for change

No changes were made to the previous guidelines.

Passive joint mobilisation

2007 guidelines

Passive joint mobilisation should only be given to patients with WAD in combination with manual and physical therapies and exercise, provided there is evidence of continuing measurable improvement. This technique should be restricted to registered health practitioners trained in the specific methods and in accordance with current professional standards.

2001 guidelines

No additional evidence specifically related to patients with WAD. One systematic review (25) and three RCTs found that mobilisation for patients with acute neck pain provided short-term benefits.

New evidence since 2001

No additional studies specifically related to mobilisation were identified, although two papers examined cervical and thoracic manipulation (see below).

Basis for change

Because the term 'mobilisation' has been used to describe active exercises, the term 'passive joint mobilisation' has been used. No other changes were made to the previous guidelines.

Not Routinely Recommended (CONTINUED)

Manipulation

2007 guidelines

A regime of manipulation should only be given to patients with WAD in combination with manual and physical therapies and exercise, provided there is evidence of continuing measurable improvement. This technique should be restricted to registered health practitioners trained in the specific methods and in accordance with current professional standards. WAD Grade III (decreased or absent tendon reflexes and/or weakness and sensory deficit) is a relative contraindication for manipulation.

2001 guidelines

No additional RCTs were found concerning manipulation for patients with whiplash or acute

neck pain since the QTF findings.

Recommendations were made on the basis of consensus of the Working Party.

New evidence since 2001

Two related papers (26, 27), which used the same study population, support the use of manipulation in patients with WAD rather than a program involving ultrasound, active exercises, multimodal therapy and pulsed EMG. Care should be taken with the interpretation of these results, however, given their relatively low quality score (PEDro score 3/10).

Basis for change

Further high-quality RCTs are required before manipulation would be routinely recommended for the treatment of WAD.

Traction

2007 guidelines

A regime of traction should only be given to patients with WAD in combination with manual and physical therapies and exercise, provided there is evidence of continuing measurable improvement.

2001 guidelines

The inclusion of traction in the 2001 guidelines was based on the QTF guidelines, which were based on consensus and weak evidence from one RCT in which traction, in combination with other physiotherapeutic interventions, was found to be of short-term benefit in patients with WAD presenting within four days of injury. There were no long-term

benefits. There was no additional evidence for the benefits of using traction to treat patients with WAD in the 2001 guidelines.

New evidence since 2001

Level I evidence that traction is ineffective from one systematic review (28), which did not receive a high-quality score according to the QUORUM rating (4/10). The conclusions of this review were based on the same previous low-quality study cited by the QTF (which received a PEDro score of 3/10).

Basis for change

There is no new high-quality evidence regarding the use of traction in the treatment of patients with WAD.

Not Routinely Recommended (CONTINUED)

Multimodal treatment

2007 guidelines

A multimodal treatment program (combination of exercise and manual therapy; see Glossary for definition) can be used for patients with WAD where scores on the appropriate outcome measure have not shown significant improvement within four to six weeks post-injury, providing there is evidence of continuing improvement with the treatment.

2001 guidelines

The recommendations in the 2001 guidelines were based on Level II evidence (31). Recommendations regarding appropriate time to commence and need for monitoring were based on Working Party consensus.

New evidence since 2001

Two related papers (26, 27) failed to show any benefit of a form of multimodal therapy over a program of manipulation for patients with WAD. However, as noted above, care should be taken with interpretation of these results given their relatively low PEDro score (3/10). It was the consensus of the Working Party that these studies were of insufficient quality and therefore this form of treatment should be disregarded.

Basis for change

No changes were made to the previous guidelines.

Acupuncture

2007 guidelines

A regime of acupuncture should only be given to patients with WAD in combination with manual and physical therapies and exercise, provided there is evidence of continuing measurable improvement.

2001 guidelines

Recommendations in the 2001 guidelines were based on the consensus of the Working Party.

New evidence since 2001

No new evidence.

Basis for change

No changes were made to the previous guidelines.

Not Routinely Recommended (CONTINUED)

Passive modalities

Passive modalities / electrotherapies include heat, ice, massage, transcutaneous electrical nerve stimulation (TENS), pulsed electromagnetic treatment (PEMT), electrical stimulation, ultrasound, laser and shortwave diathermy.

2007 guidelines

WAD Grade I – PEMT is not recommended because it involves wearing a soft collar eight hours per day for 12 weeks.

WAD Grades II and III – During the first three weeks the other professionally administered passive modalities/electrotherapies are optional adjuncts to manual and physical therapies and exercise, with emphasis on return to usual activity as soon as possible.

2001 guidelines

Recommendation regarding PEMT was based on the original QTF guidelines, which were based on two small RCTs that showed a benefit of this form of therapy for patients with WAD. However, because it involves wearing a soft collar for eight hours a day for 12 weeks, it is not recommended. No studies independently assess the use of these modalities in the treatment of patients with WAD.

New evidence since 2001

No new evidence.

Basis for change

No change were made to the previous guidelines.

Surgical treatment

2007 guidelines

There are no indications for surgical intervention in almost all patients with WAD Grades I to III. Surgery should be restricted to the rare patients with WAD Grade III 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.

2001 guidelines

Recommendations in the 2001 guidelines were based on QTF guidelines. No studies were included that concerned the benefits of surgery in the acute management of patients with WAD Grades I to III.

New evidence since 2001

No new evidence.

Basis for change

No changes were made to the previous guidelines.

Not Recommended

➡ Pharmacology

2007 guidelines

Details on pharmacology are found on page 23.

➡ Cervical pillows

2007 guidelines

Cervical pillows are not recommended.

New evidence since 2001

No new evidence.

2001 guidelines

The 2001 guidelines were based on the QTF guidelines, which were consensus based. No evidence exists regarding the use of cervical pillows by patients with WAD.

Basis for change

No changes were made to the previous guidelines.

➡ Immobilisation – prescribed rest

2007 recommendations

Prescribed rest for more than four days is not recommended.

(21) has arisen. In the latter study, subjects were randomly assigned to resting and wearing a collar or to a protocol of active movements. These treatments were applied within four days of initial injury or after two weeks. Treatment benefits favoured those that received early active treatment.

2001 guidelines

The 2001 guidelines were based on the original QTF guidelines and the findings of one study (16).

Basis for change

New Level 1 and II evidence supports that patients with WAD receive more benefits if they remain active after their injury.

New evidence since 2001

Level I evidence (19, 20, 28) and Level II evidence

Not Recommended (CONTINUED)

Immobilisation – collars

2007 guidelines

Collars should not be prescribed for patients with WAD. If they are prescribed, they should not be used for more than 48 hours.

2001 guidelines

The 2001 guidelines were based on QTF recommendations and Grade II evidence.

New evidence since 2001

New Grade I (19, 20, 28, 29) and Grade II (21, 23, 30) evidence is now available. These studies have found that collars are not effective for use in patients with WAD.

Basis for change

New Grade I and Grade II evidence showing that active treatment is more beneficial for patients with WAD than immobilisation in a collar. If collars are prescribed, their use should be limited to a period of 48 hours.

Spray and stretch

2007 recommendations

Spray and stretch is not recommended for the treatment of patients with WAD.

2001 guidelines

The recommendations in the 2001 guidelines were consensus based because there was no evidence regarding the use of spray and stretch as a treatment for patients with WAD.

New evidence since 2001

No new evidence.

Basis for change

No changes were made to the previous guidelines.

Not Recommended (CONTINUED)

Injections – steroid injections

2007 guidelines

Intra-articular steroid injections are not recommended for patients with WAD.
Epidural steroid injections should not be used for patients with WAD Grades I or II.
Occasionally, patients with WAD Grade III who have unresolved radicular pain that has persisted for more than one month might benefit from epidural steroid injections.

There is no indication for steroid trigger point injection in the acute phase.
Intrathecal steroid injections should be avoided in all patients with WAD.

2001 guidelines

The recommendations in the 2001 guidelines were consensus based because no evidence was found for the use of steroids in the acute treatment of WAD Grades I to III.

New evidence since 2001

No new evidence.

Basis for change

No changes were made to the previous guidelines.

Magnetic necklaces

2007 recommendations

Magnetic necklaces are not recommended for the treatment of patients with WAD.

2001 guidelines

The 2001 guidelines were based on QTF recommendations, which were consensus based and based on one RCT that showed no benefit of magnetic necklaces over placebo for subjects with chronic neck pain. No other evidence was found.

New evidence since 2001

No new evidence.

Basis for change

No changes were made to the previous guidelines.

Not Recommended (CONTINUED)

Other interventions

Other interventions include Pilates, Feldenkrais, Alexander Technique, massage and homeopathy.

2007 guidelines

Pilates, Feldenkrais, Alexander Technique, massage and homeopathy are not recommended for the treatment of patients with WAD.

New evidence since 2001

No new evidence.

Basis for change

No changes were made to the previous guidelines.

2001 guidelines

The recommendations in the 2001 guidelines were consensus based because no evidence was found to support the use of these treatments in patients with WAD.



Table 3 below summarises the changes in the 2007 recommended treatments in comparison with those in the 2001 guidelines. Table 3 lists the level of evidence available (based on NHMRC gradings – see Appendix 4) for the treatments which have been considered.

Table 3. Summary of Changes to Recommended Treatments since Previous Guidelines

Previous Guidelines (2001)	Recommendations for New Guidelines (2007)
Recommended Treatment	
<ul style="list-style-type: none"> ▶ Reassure/Act as usual ▶ Prescribed functional exercises – return to usual activity, work alteration, relaxation techniques ▶ Exercise – ROM exercises, muscle re-education, low-load isometric exercises ▶ Pharmacology – simple analgesics, NSAIDs 	<ul style="list-style-type: none"> ▶ Reassure/Act as usual ▶ Prescribed functional exercises – return to usual activity, work alteration ▶ Exercise – ROM exercises, muscle re-education ▶ Pharmacology – simple analgesics
Treatments Not Routinely Recommended	
<ul style="list-style-type: none"> ▶ Postural advice ▶ Passive joint mobilisation ▶ Manipulation ▶ Traction ▶ Acupuncture ▶ Multimodal treatment ▶ Passive modalities / electrotherapies ▶ Immobilisation – prescribed rest ▶ Immobilisation – collars ▶ Surgical treatment 	<ul style="list-style-type: none"> ▶ Postural advice ▶ Passive joint mobilisation ▶ Manipulation ▶ Traction ▶ Acupuncture ▶ Multimodal treatment ▶ Passive modalities / electrotherapies ▶ Surgical treatment ▶ Pharmacology – NSAIDs and strong analgesics
Treatments Not Recommended	
<ul style="list-style-type: none"> ▶ Cervical pillows ▶ Spray and stretch ▶ Intra-articular and intrathecal steroid injections ▶ Magnetic necklaces ▶ Other interventions e.g., Pilates, massage, etc 	<ul style="list-style-type: none"> ▶ Cervical pillows ▶ Spray and stretch ▶ Intra-articular and intrathecal steroid injections ▶ Magnetic necklaces ▶ Other interventions e.g., Pilates, massage, etc ▶ Immobilisation – collars for > 48 hours ▶ Pharmacology – Psychopharmacological agents

NSAIDs – nonsteroidal anti-inflammatory drugs; ROM – range of movement.

Table 4. Level of Evidence for Treatments used for Acute Whiplash

Interventions	Level of Evidence (NHMRC Gradings – see Appendix 4)
Evidence of Benefit	
Advice to stay active / Education	Levels I and II (2,14,15,16)
Exercises	Levels I and II (18, 19, 20, 21, 22, 23)
Insufficient Evidence – Limited RCTs	
Simple analgesics / NSAIDs	Level II (24)
Multimodal treatment	Level II (31)
Manipulation / passive joint mobilisation	Level II (26, 27)
McKenzie therapy – one RCT showed this therapy provided benefits in addition to active cervical ROM exercises, rather than rest, collar and self mobilisation – requires further investigation	Limited level II (21)
Methylprednisolone – one RCT, not recommended because of side effects	Level II (32)
Traction	Level I (28) based on one RCT that did not support use of traction
No Evidence – No RCTs	
Postural advice	No level I or II evidence
Acupuncture	No level I or II evidence
Passive modalities / electrotherapy	No level I or II evidence
Surgical treatment	No level I or II evidence
Cervical pillows	No level I or II evidence
Spray and stretch	No level I or II evidence
Magnetic necklaces	No level I or II evidence
Steroidal injections	No level I or II evidence
Evidence of No Benefit	
Immobilisation – collars	Levels I and II (23, 28, 30, 33)
Immobilisation – prescribed rest	Level I (19, 20, 28)

NSAIDs – nonsteroidal anti-inflammatory drugs; ROM – range of movement.

Appendix 1. The Working Party

Thanks go to the Research Consultants and the Working Party who guided this project.

In establishing this Working Party the MAA was aware that primary care health professionals, especially general practitioners, physiotherapists and chiropractors, manage most of the treatment arising from WAD.

Research Consultants

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*Also a member of the Technical Working Party

Appendix 2. 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.
IES	Impact of Event Scale.
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 limit of its available range.
Multidisciplinary pain team	A group of health care providers capable of assessing and treating the physical, psychosocial, medical, vocational and social aspects of patients with chronic pain. The healthcare team should hold regular meetings concerning individual treatment outcomes and evaluate overall program effectiveness.
Multimodal treatment	Management that includes simultaneous application of several different treatment modalities, including relaxation training, manual and physical therapies, exercise, postural training and psychological support.
MVA	Motor vehicle accident.
NDI	Neck Disability Index.
NSAIDs	Nonsteroidal anti-inflammatory drug(s).

Appendix 2. Glossary (CONTINUED)

Passive modalities	Electrotherapeutic agents that are applied for the relief of pain and assisting the resolution of the inflammatory response. They are administered passively to the patient.
PEMT	Pulsed electromagnetic treatment.
Postural advice	Specific instructions on posture.
Prescribed function	Recommendation of specific activity, e.g., walking.
Prescribed rest	Recommendation of 'rest' that may include avoidance of some activities of daily living.
QTF	Quebec Task Force.
Radicular irritation	Symptoms caused by irritation of the nerve root.
RCT	Randomised controlled trial.
Relaxation	Techniques used to reduce muscle tension and anxiety.
ROM	Range of movement.
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, a non-invasive low frequency electrical stimulation that 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.
VAS	Visual Analogue Scale.
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 of which 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.

Appendix 3. Outcome measures

➡ Pain Visual Analogue Scale (VAS)



The VAS (40) for pain consists of a 10 cm* line with two end-points representing 'no pain' and 'pain as bad as it could possibly be'. Patients with WAD 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.

** For accuracy in scoring pain level, please print this page at 100% to ensure line is shown as 10 cm.*

➡ The Neck Disability Index (NDI)

The NDI (34) (see page 38) is designed to measure neck-specific disability and is based on the Oswestry Disability Questionnaire. 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 or as raw scores (out of 50). The NDI is translated into over 20 languages. If the questionnaire is required in a language other than English please contact the MAA at: rehab@maa.nsw.gov.au

In these guidelines, use of the raw score is recommended.

continued over

The Neck Disability Index

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 only the ONE box in each section 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 to 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 (35) appears on the following page. It combines concepts of the Oswestry Low Back Pain Disability Questionnaire and the NDI 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 NDI. 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.

Solo practitioners or groups of up to nine practitioners may copy and use The Functional Rating Index subject to the terms of the Limited Licence Agreement available at: www.chiroevidence.com

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.

Functional Rating Index

For use with **Neck and/or Back Problems** only.

Patient Name _____ Date _____

In order to properly assess your condition, we must understand how much your **neck and/or back problems** have affected your ability to manage everyday activities. For each item below, **please circle the number which most closely describes your condition right now.**

1. Pain Intensity

0 ----- 1 ----- 2 ----- 3 ----- 4
 No pain Mild pain Moderate pain Severe pain Worst pain possible

2. Sleeping

0 ----- 1 ----- 2 ----- 3 ----- 4
 Perfect sleep Mildly disturbed sleep Moderately disturbed sleep Greatly disturbed sleep Totally disturbed sleep

3. Personal Care (washing, dressing, etc)

0 ----- 1 ----- 2 ----- 3 ----- 4
 No pain; no restrictions Mild pain; no restrictions Moderate pain; need to go slowly Moderate pain; need some assistance Severe pain; need 100% assistance

4. Travel (driving etc)

0 ----- 1 ----- 2 ----- 3 ----- 4
 No pain on long trips Mild pain on long trips Moderate pain on long trips Moderate pain on short trips Severe pain on short trips

5. Work

0 ----- 1 ----- 2 ----- 3 ----- 4
 Can do usual work plus unlimited extra work Can do usual work; no extra work Can do 50% of usual work Can do 25% of usual work Can not work

6. Recreation

0 ----- 1 ----- 2 ----- 3 ----- 4
 Can do all activities Can do most activities Can do some activities Can do a few activities Can not do any activities

7. Frequency of Pain

0 ----- 1 ----- 2 ----- 3 ----- 4
 No pain Occasional pain; 25% of the day Intermittent pain; 50% of the day Frequent pain; 75% of the day Constant pain; 100% of the day

8. Lifting

0 ----- 1 ----- 2 ----- 3 ----- 4
 No pain with heavy weight Increased pain with heavy weight Increased pain with moderate weight Increased pain with light weight Increased pain with any weight

9. Walking

0 ----- 1 ----- 2 ----- 3 ----- 4
 No pain; any distance Increased pain after 1.6 kilometres Increased pain after .8 kilometres Increased pain after .4 kilometres Increased pain with all walking

10. Standing

0 ----- 1 ----- 2 ----- 3 ----- 4
 No pain after several hours Increased pain after several hours Increased pain after 1 hour Increased pain after 1/2 hour Increased pain with any standing

 Examiner

 Patient Signature

Patient-Specific Functional Scale (1998 version)

The Patient-Specific Functional Scale (36) 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. When conducting the Patient-Specific Functional Scale, subjects are asked to identify three important activities that they are unable to perform 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 preinjury 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.

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)?

Patient-Specific Functional Scale

Scoring scheme (show patient scale):

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

Activity	Date/score							
1.								
2.								
3.								
Additional								
Additional								

Core Whiplash Outcome Measure (CWOM)

The CWOM is a five-item scale that is brief and user friendly for clinicians (37). It helps clinicians measure several constructs of health, including pain symptoms, function and well-being. In addition, it enables the number of days taken off work to be measured, which is a useful measure for CTP insurers. The CWOM has high construct validity with the Functional Rating Index and the NDI, and equal responsiveness in the short-term 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 five 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.

Impact of Event Scale (IES)

The IES was developed by Horowitz, Wilner, and Alvarez to measure current subjective distress related to a specific event (38). The IES is a self-report measure of posttraumatic disturbance and is very widely used.

The scale is reproduced with permission from the author.

Scoring Method

Each item is scored:

Not at all = 0

Rarely = 1

Sometimes = 3

Often = 5

The item scores are summed. A total score of 26 or more, at 6 weeks after injury is in the “moderate” range. A score of > 43 is “severe”.

See page 46.

Core Whiplash Outcome Measure

Instructions

Please answer questions 1 to 5

Date: _____

-
1. During the past week, how bothersome have your whiplash symptoms been?
- not at all bothersome
- slightly bothersome
- moderately bothersome
- very bothersome
- 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 four 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

Impact of Event Scale – Initial

On _____ you experienced a motor vehicle accident.

Below is a list of comments made by people after stressful life events. Using the following scale, please indicate with an 'x' how frequently each of these comments were true for you DURING THE PAST SEVEN DAYS. If they did not occur during that time please mark the 'NOT AT ALL' column.

	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 pictures or thoughts about it 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 about it.				
8. I felt as if it hadn't happened or it 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 were kind of numb.				

➡ Ratings for the Level of Evidence for Recommendations

Where appropriate, studies meeting the eligibility criteria for inclusion in the diagnosis review were assessed for methodological quality using the STARD checklist (39) for diagnostic studies. Please note that in this document the terms 'level' and 'grade' are used interchangeably

The level of evidence for recommendations in the Prognosis section is rated as strong, moderate, limited or inconclusive, using the methodology of Scholten-Peeters (3) described in the Technical Report.

For the treatment section, the NHMRC rating scale for quality of evidence is used, which is consistent with the 2001 guidelines, because RCTs are possible in the study of treatment efficacy.

This rating scale is as follows:

Grade I
Evidence obtained from a systematic review of all relevant RCTs.
Grade II
Evidence obtained from at least one properly designed RCT.
Grade III-1
Evidence obtained from well-designed pseudo-RCTs.
Grade III-2
Evidence obtained from comparative studies with concurrent controls and where allocation is not randomised (cohort studies), case-control studies, or interrupted time series with a control group.
Grade III-3
Evidence obtained from comparative studies with historical control, two or more single arm studies, or interrupted time series without a parallel control group.
Grade IV
Evidence obtained from a case series, either post-test or pre-test and post-test.



Appendix 5. References

- 1) Guidelines for the Management of Whiplash Associated Disorders. Motor Accidents Authority of NSW, 2001
- 2) Scientific Monograph of the Quebec Task Force on Whiplash-Associated Disorders, Redefining Whiplash and its Management. *Spine* 1995; Supplement vol 20: No. 85
- 3) Scholten-Peeters GCM, Verhagen AP, Bekkering GE, Van der Windt DAWM, Barnsley L, Oostendorp RAB, 'Prognostic Factors of Whiplash-Associated Disorders: A Systematic Review of Prospective Cohort Studies'. *Pain* 2003; 104: 303–322
- 4) See www.pedro.fhs.usyd.edu.au
- 5) Moher D, Cook D, Eastwood S, Olkin I, Rennie D, Stroup DF, 'Improving the Quality of Reports of Meta Analyses of Randomised Controlled Trials: the QUORUM Statement. Quality of Reporting of Meta-Analyses'. *Lancet* 1999; 354 (9193): 1896–1900
- 6) Kasch H, Bach FW, Jensen TS, 'Handicap after Acute Whiplash Injury: A One Year Study of Risk Factors'. *Neurology* 2001; 56: 1637–1643
- 7) Sterling M, Jull G, Vicenzino B, Kenardy J, 'Sensory Hypersensitivity occurs soon after Whiplash and is Associated with Poor Recovery'. *Pain* 2003; 104: 509–517
- 8) Ovadia D, Steinberg EL, Nissan M, Dekel S, 'Whiplash Injury – A Retrospective Study on Patients Seeking Compensation'. *Injury* 2002; 33: 569–573
- 9) Stiell IG, Clement CM, McKnight RD, Brison R, Schull MJ, Rowe BH, Worthington JR et al, 'The Canadian C-Spine Rule versus the NEXUS Low Risk Criteria in Patients with Trauma'. *NEJM* 2003; 349: 2510–2518
- 10) Steinberg EL, Ovadia D, Nissan M, Menahem A, Dekel S, 'Whiplash Injury: Is there a Role for Electromyographic Studies?' *Arch. Orth. Trauma Surg.* 2005; 125: 46–50
- 11) Richter M, Ferrari R, Otte D, Kuesebeck H, Blauth M, Kettek C, 'Correlation of Clinical Findings, Collision Parameters and Psychological Factors in the Outcome of Whiplash Associated Disorders'. *J. Neurol. Neurosurg, Ps.* 2004; 75: 758–764
- 12) Gun, R, Osti O, O'Riordan A, Mpelasoka F, Eckerwall C, Smyth J. 'Risk Factors for Prolonged Disability after Whiplash Injury: a Prospective Study'. *Spine* 2005; 30 (4): 386–391
- 13) Sterling M, Jull G, Vicenzino B, Kenardy J, Darnell R, 'Physical and Psychological Factors predict Outcome following Whiplash Injury'. *Pain* 2005; 114: 141–148
- 14) Cassidy JD, Linda JC, Cote P, Lemstra M, Berglund A, Nygren A, 'Effect of Eliminating Compensation for Pain and Suffering on the Outcome of Insurance Claims for Whiplash Injury'. *NEJM* 2000; 342: 1179–1186
- 15) Hartling L, Brison R, Ardern C, Pickett W, 'Prognostic Value of the Quebec Classification of Whiplash-Associated Disorders'. *Spine* 2001; 26:36–41
- 16) Cote B, Hogg-Johnson S, Cassidy J, Carroll L, Frank J, Bombardier C, 'Initial Patterns of Clinical Care and Recovery from Whiplash Injuries'. *Arch. Int. Med.* 2005;165: 2257–2263
- 17) Borchgrevink GE, 'Acute Treatment of Whiplash Neck Sprain Injuries'. *Spine* 1998; 23: 25–31
- 18) Verhagen AP, Scholten-Peeters GGM, de Bie RA, Bierma-Zeinstra SM, 'Conservative Treatments for Whiplash'. *Cochrane Library* Volume 4, 2005
- 19) Seferiadis A, 'A Review of Treatment Interventions in Whiplash-Associated Disorders', *Europ. Spine J.* 2004; 13: 387–397
- 20) Conlin A, Bhogal S, Sequeira K, Teasell R, 'Treatment of Whiplash Associated Disorders- Part 1: Non-invasive Interventions'. *Pain Res. Man.* 2005; 10: 21–32
- 21) Rosenfeld M, Seferiadis A, Carlssen J, Gunnarsson R, 'Active Intervention in Patients with Whiplash Associated Disorders improves Long Term Prognosis'. *Spine* 2003; 28: 2491–2498

- 22) Bonk AD, Ferrari R, Giebel G, Edelmann M, Huser R, 'Prospective Randomised Controlled Study of Activity versus Collar and the Natural History for Whiplash Injury in Germany'. *J. Musc. Pain* 2000; 8: 123–132
- 23) Schnabel M, Ferrari R, Vassiliou T, Kaluza G, 'Randomised, Controlled Outcome Study of Active Mobilisation compared with Collar Therapy for Whiplash Injury'. *Emerg. Med. J.* 2004; 21: 305–310
- 24) Gunsberg R, 'Efficacy of an NSAID (Tenoxicam) in the Acute Phase of Whiplash'. *Proc. World Congress Whip. Ass. Disord.* 1999; 116
- 25) Hurwitz EL, 'Manipulation and Mobilisation of the Cervical Spine: A Systematic Review of the Literature'. *Spine* 1996; 21: 1746–1759
- 26) Fernandez de las Penas, 'Manipulation Treatment versus Conventional Physiotherapy Treatment in Whiplash Injury; A Randomized Controlled Trial'. *J. Whip. Rel. Dis.* 2004; 3: 73–90
- 27) Fernandez de las Penas, Fernandez-Carnero J, Fernandez A, Lomas-Vega R, Miangolarra-Page JC, 'Dorsal Manipulation in Whiplash Injury Treatment: a Randomized Controlled Trial'. *J. Whip. Rel. Dis.* 2004; 3: 55–72
- 28) Barnsley L, 'An Evidence-Based Approach to the Treatment of Acute Whiplash Injury'. *Pain Rsch and Mgt* 2003; 8: 33–36
- 29) McClune T, 'Whiplash-Associated Disorders: A Review of the Literature'. *Emerg. Med. J.* 2002; 19: 499–506
- 30) Crawford JR, 'Early Management and Outcome following Soft Tissue Injury of the Neck: A Randomised Controlled Trial'. *Injury* 2004; 35: 891–895
- 31) Provinciali L, Baroni L, Illuminati L, Ceravolo M, 'Multimodal Treatment to prevent the Late Whiplash Syndrome'. *Scand. J. Rehab. Med.* 1996; 28: 105–111
- 32) Petterson K, Toolanen G, 'High Dose Methylprednisolone prevents extensive Sick Leave after Whiplash Injury'. *Spine* 1998; 23: 984–989
- 33) Gennis P, Miller L, Gallagher E, Giglio J, Carter W, Nathanson N, 'The Effect of Soft Cervical Collars on Persistent Neck Pain in Patients with Whiplash Injury'. *Acad. Emerg. Med.* 1996; 3: 568–73
- 34) Vernon H, Mior S, 'The Neck Disability Index: A Study of Reliability and Validity'. *J. Manip. Physiol. Ther.* 1991; 14: 409–415
- 35) Feise RJ, Menke JM, 'Functional Rating Index: A New Valid and Reliable Instrument to Measure the Magnitude of Clinical Change in Spinal Conditions'. *Spine* 2001; 26: 78–87
- 36) Westaway M, Stratford P, Binkley J, 'The Patient Specific Functional Scale: Validation of its Use in Persons with Neck Dysfunction'. *J. Orthop. Sport. Phys.* 1998; 27: 331–338
- 37) Rebbeck T, Refshauge K, Maher C, 'Evaluation of the Core Outcome Measure in Whiplash'. *Spine* 2007; 32 (6): 696–702
- 38) Horowitz, M., Wilner, M., and Alvarez, W, 'Impact of Event Scale: A measure of subjective stress'. *Psychosom. Med.* 1979; 41: 209–218
- 39) Bossuyt PM, Reitsma JB, Bruns DE, Gatsonis C, Glasziou P, Irwig L, Lijmer J, Moher D, Rennie D, de Vet H, 'The STARD Group: Towards Complete and Accurate Reporting of Studies of Diagnostic Accuracy. The STARD Initiative'. *Fam. Prac.* 2004; 21: 4–10
- 40) Scott J, Huskisson E, 'Graphic Representation of Pain'. *Pain* 1976; 2: 175–184

Appendix 6. Exercises

➤ Exercises that will help

The following is an extract from the companion document to this Guide, *'Your Guide to Whiplash Recovery in the first 12 weeks after the accident – for Consumers 2nd Edition 2007'*.

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; and/or
- ▶ that exercises consistently produce 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 your 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 you are 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; and
- ▶ expect some discomfort, but remember exercises should not cause severe pain.

➤ Neck exercises while lying down

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

1. The chin nod exercise¹

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.



1. Jull GA 'The management of cervical headache'.
Manual Therapy 1997 2(4):182-190

2. 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.

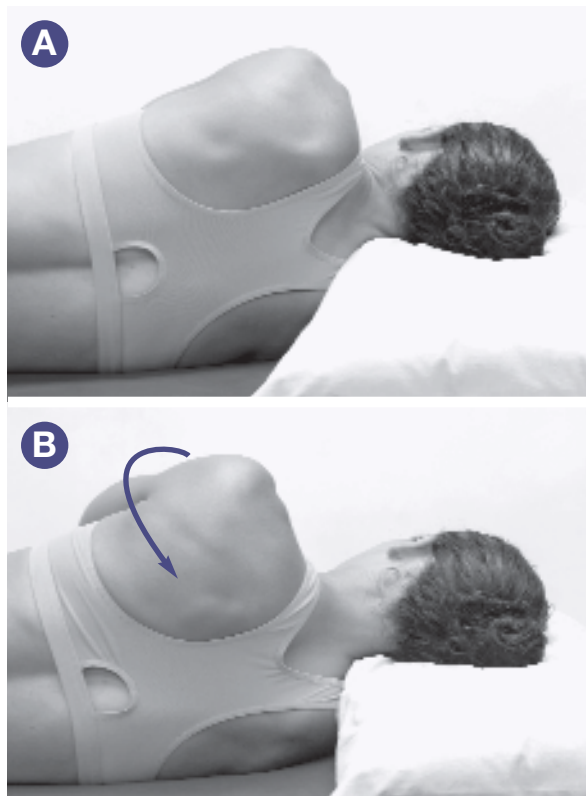


3. Shoulder blade exercise

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

A Lie on your right side with your arm resting up on two pillows. **B** Roll your left 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 left side for the right shoulder blade.

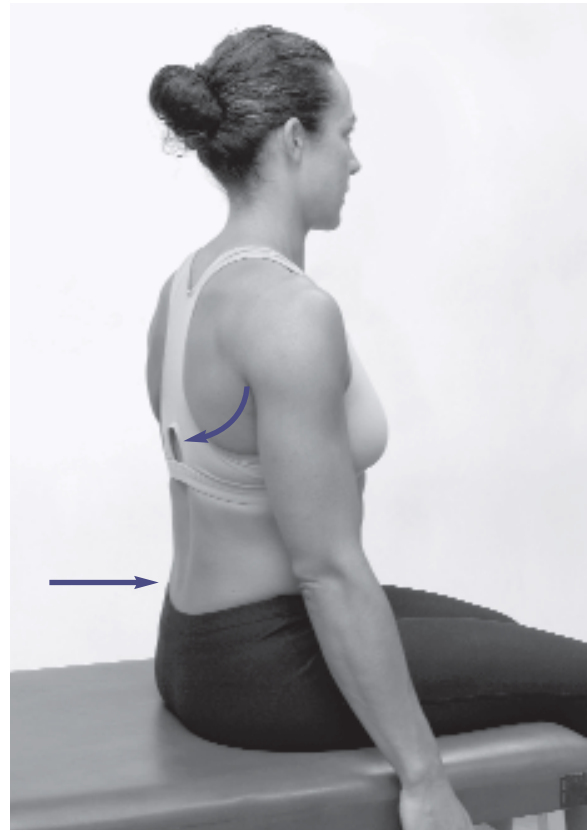


Exercises while sitting

4. 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. 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, on a train or bus and sitting at home.



5. Neck retraction

A Sit in the correct postural position as shown in exercise 4 above. **B** 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 4. Repeat all exercises below 10 times to each side.

6. 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 exercise you did lying down, only this time you do it sitting.



7. 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.



8. Bending and extension

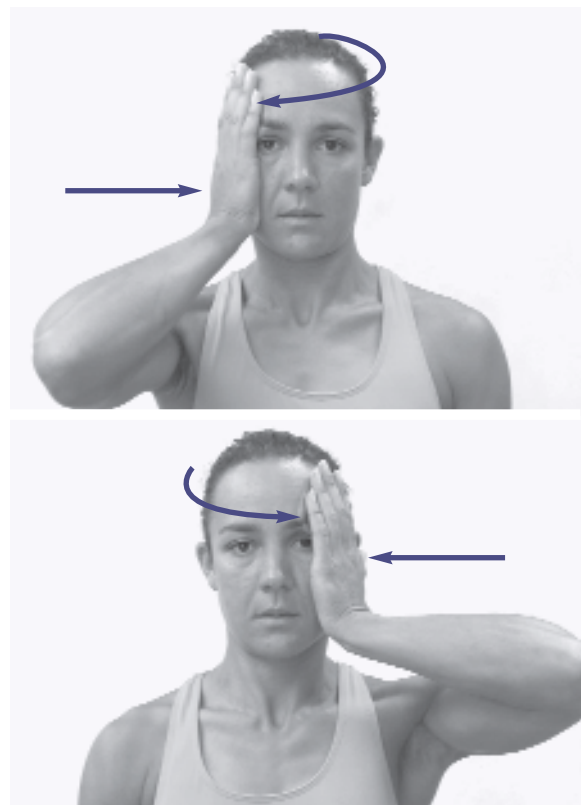
Gently bend your head towards your chest. Lead the movement with your chin. Moving the chin first, bring your head back to the upright position and gently roll it back to look up towards the ceiling. Leading with your chin, return your head to the upright position.



Neck strengthening exercises (Exercises 9-11) should only be started later in your recovery. If you are unsure when to begin this, ask your treating health professional.

9. Neck strengthening exercises (isometric, no movement exercise)

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 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

Firstly, adopt the safe 4-point kneeling position. Begin by ensuring your knees are directly under your hips, and your hands directly under your shoulders. Your lower 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, proceed with the neck movement exercises as described below.

10. Neck bending and extension in 4-point kneeling

- A** Adopt the safe 4-point kneeling position.
- B** Slowly look up toward the ceiling as far as you can go. Hold for 5-10 seconds.
- C** 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.



11. Neck rotation in 4-point kneeling

Adopt the safe 4-point kneeling position. Slowly rotate your head (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 positioning yourself side-on to a mirror so that you can check your head position. Repeat to the other side. Perform 5-10 repetitions.



Other whiplash publications

Summary Guidelines for the Management of Acute Whiplash-Associated Disorders for Health Professionals – 2nd Edition 2007

Your Guide to Whiplash Recovery in the first 12 weeks after the accident – for Consumers 2nd Edition 2007

Compulsory Third Party Claims Guide for the Management of Acute Whiplash-Associated Disorders – An Insurer's Guide 2nd Edition 2007

Technical Report: Guidelines for the Management of Acute Whiplash-Associated Disorders – 2nd Edition 2007

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