Clinical Guidelines for Assessing Vertebrobasilar Insufficiency in the Management of Cervical Spine Disorders

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These guidelines comprise a set of recommendations regarding assessing for vertebrobasilar insufficiency and obtaining informed consent prior to the application of cervical spine manipulation and mobilisation, based on the most recent evidence. These guidelines replace the APA Clinical Guidelines for Pre-Manipulative Procedures for the Cervical Spine (2000).

The APA wishes to acknowledge Musculoskeletal Physiotherapy Australia (MPA), for the revision of these guidelines.

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MPA IS A NATIONAL SPECIAL GROUP OF THE APA
CLINICAL GUIDELINES
FOR ASSESSING VERTEBROBASILAR INSUFFICIENCY
IN THE MANAGEMENT OF CERVICAL SPINE DISORDERS

Introduction

The presence or development of dizziness, or other possible symptoms of vertebrobasilar insufficiency (VBI) should be carefully assessed in any patient for whom examination or treatment of the cervical spine is to be undertaken. It is important that the physiotherapist has the knowledge needed to recognise symptoms and signs potentially associated with VBI. To ensure safe practice, the physiotherapist must also have a thorough understanding of the implications of such symptoms and signs in the management of cervical spine disorders. The aim of these clinical guidelines is to facilitate the clinical recognition of VBI by all physiotherapists who treat the cervical spine using procedures which could compromise the vertebral artery or trigger adverse neurovascular events, most notably cervical manipulation and mobilisation. For the purpose of these clinical guidelines, manipulation is defined as a procedure involving a high velocity thrust, whereas the term mobilisation refers to any other manual joint movement procedure applied to the cervical spine.

This document details the symptoms and signs that may be potentially associated with VBI, together with clinical guidelines recommended by the Australian Physiotherapy Association (APA) and Musculoskeletal Physiotherapy Australia (MPA, a National Special Group of the APA) for examination and treatment of all patients with disorders of the cervical spine. While the clinical guidelines are recommended, they are primarily provided to help inform the clinical reasoning of the physiotherapist in their management of the individual patient. The document also describes the recommended procedure for provision of information to patients about cervical manipulation and mobilisation, obtaining consent and the recording of these steps. The physiotherapist is reminded that VBI is not the only safety consideration when assessing and treating the cervical spine, and to this end a checklist for use prior to spinal manipulation is included for information in Appendix 1. A summative Clinical Flowchart for the appropriate application of cervical manipulation and mobilisation procedures involving end-range rotation is included in Appendix 2. Key supporting references are found in Appendix 3.

Physiotherapists should be aware of the following points in relation to the use of provocative testing for VBI:

- The tests themselves are provocative and therefore hold some inherent risk. However, if appropriately selected and performed with care (including only to the initial point of provocation of symptoms), any potential risk to the patient will be minimised. The provocation of symptoms or signs during testing should alert the physiotherapist to the need for particular care in the selection of examination and treatment procedures.
- The recommended tests are the most valid procedures for determining the presence of VBI and the adequacy of the collateral circulation identified in the literature to date. Although the tests have shown mixed results in relation to changes in vertebrobasilar arterial blood flow in experimental studies, it appears that end-range rotation is the most sensitive cervical position. Recent research has also identified blood flow changes in the simulated manipulation position.
- There is no simple clinical method for testing the intrinsic state of the vertebral artery and physiotherapists should be cognisant of this when examining or treating the cervical spine. The recommended tests will not identify all patients at risk of suffering an adverse event following cervical manipulation or mobilisation.

Assessment for the presence of symptoms and signs associated with VBI occurs at four stages in the management of a patient with an upper quadrant disorder:

1. History (subjective examination)
2. Physical (objective) examination
3. During treatment of the cervical spine, and

Decisions on management, including choice of treatment, should be continually (re-)evaluated on the basis of the outcome of these assessments.
Section 1. History (Subjective Examination)

In every patient presenting with upper quadrant dysfunction, questioning is specifically directed to determine the presence of dizziness which is the most common presenting symptom of VBI. If dizziness is present, other symptoms associated with VBI should be sought, including:

- Visual disturbances such as diplopia (double vision), blurred vision and transient hemianopia
- Dysarthria (difficulty with speech)
- Dysphagia (difficulty with swallowing)
- Drop attacks (sudden loss of power with no loss of consciousness)
- Nausea and vomiting
- Lightheadedness and fainting
- Disorientation or anxiety
- Hearing disturbances such as tinnitus
- Facial or oral paraesthesia or anaesthesia
- Pallor, tremors and sweating
- Other neurological symptoms.

Enquiry should also determine the nature of any neck pain or headache, which are usually the first symptoms of dissection of the vertebral artery. Specifically, sudden, severe, sharp pain located in the ipsilateral postero-superior region of the neck and occiput and for which there is no past history should be regarded as suspicious. Patients may also report a history of cervical trauma or neck stiffness, and their neck range of motion can be restricted. Pain usually precedes ischaemic symptoms and signs, with the time interval varying among individuals. Until the ischaemic response becomes manifest it can be difficult to differentiate a dissecting vertebral artery from a benign mechanical neck disorder. It is therefore prudent to initially treat conservatively and carefully monitor progress.

Should the patient suffer from any of the symptoms associated with VBI described above, then questioning should explore the symptoms further, including:

- The type, degree, frequency and duration of the dizziness or other symptoms
- The production or aggravation of the symptoms by neck movements or sustained positions, particularly those involving rotation or extension
- The temporal history of the symptoms relative to the history of the patient’s complaint
- The status of the symptoms
- Any previous treatment and its effect on the symptoms.

Some features may facilitate differentiation of dizziness or other symptoms associated with VBI from similar symptoms produced by other conditions:

- Constancy of symptoms
  - symptoms associated with VBI are rarely constant
- Provocation of symptoms
  - by a change of position in relation to gravity is strongly indicative of a vestibular disorder or, if from a low to a high position, orthostatic hypotension
  - by rolling in bed rather than by head movement is typical of a vestibular disorder, particularly if accompanied by nystagmus
- Symptoms and nystagmus that are latent, fatiguable and habituate are typical of a vestibular disorder. When nystagmus is associated with VBI, it demonstrates no fatiguability.

It should be noted, however, that other conditions such as vestibular disease, ear disease, cardiovascular disease, migraine, epilepsy, stroke and head injury may co-exist with VBI.
Section 2. Physical (Objective) Examination

2.1 Routine examination for all patients with upper quadrant dysfunction

In every patient for whom treatment of the cervical spine is to be performed, routine physical examination of the cervical spine must be undertaken, including physiological movements to the end of available range with overpressure (where applicable). Physiotherapists should enquire about the presence of any symptoms associated with VBI and observe for any signs regularly throughout the physical (objective) examination, most notably during cervical physiological and accessory movement testing. In patients whose physiological movements are restricted by pain or stiffness, the vertebrobasilar system may not be adequately compromised. Physiotherapists should be mindful of this limitation to their examination and consider this information in their decision-making about treatment choice.

2.2 Testing for patients who report symptoms associated with VBI during the history (subjective examination)

If reported symptoms are clearly indicative of VBI or vertebral artery dissection then provocative testing is not required and medical opinion should be sought prior to undertaking any examination or treatment of the cervical spine. In such cases, the physiotherapist should be mindful that the tests by their very nature can be stressful to the vertebral artery. When symptoms are undifferentiated or unclear as to their origin, provocative testing should be undertaken in supine lying or sitting as indicated by the patient’s history (subjective examination)25, 33.

If dizziness or other symptoms are provoked in either of these positions (i.e. supine lying or sitting), the test can be repeated in the alternative position. This will facilitate differentiation between symptoms caused by VBI and those related to the vestibular system. This is because the vestibular system is affected by gravity so that symptoms will be different in supine lying compared to sitting, whereas symptoms related to VBI will be essentially unchanged32.

The recommended minimum testing for a patient who reports symptoms associated with VBI (but which are not clearly indicative of neurological ischaemia) comprises the following:

- Any position or movement which provokes symptoms as described by the patient
- Sustained end-range cervical rotation to the left and right if any cervical procedure is being considered which is equal or greater in vigour to this test25.

All positions should be sustained for a minimum of 10 seconds, unless symptoms or signs are provoked sooner. The physiotherapist should examine the patient’s eyes for the production of nystagmus while the neck is held in the sustained position and simultaneously question the patient about the (re)production of symptoms.

On return to neutral from the sustained position, a period of at least 10 seconds should be allowed before proceeding with the next examination procedure. During this time, the patient should be questioned about the provocation of symptoms and the patient’s eyes should again be observed for nystagmus. Physiotherapists should be aware of the potential for a latent response to movement and positional testing.

Provocative testing should be immediately ceased upon provocation of symptoms or signs clearly indicative of VBI.

The physiotherapist must determine the benefit of additional testing for any particular patient based on their clinical presentation. If additional testing is required to further test for the presence of symptoms or signs associated with VBI or further test collateral circulation, upper cervical extension can be added to end-range rotation and sustained as described above.

If dizziness is provoked upon rotation movement or sustained position and its origin is unclear, rotation can be further explored in the standing position in order to differentiate dizziness arising from the vestibular apparatus of the inner ear from that arising from the cervical spine (either cervical vertigo or VBI):

- For positional provocation, head held still by the physiotherapist with sustained trunk rotation to left and right.
- For movement provocation, head held still by the physiotherapist with active trunk rotation to left and right.

Again, sustained positions are held for a minimum of 10 seconds, or less if symptoms or signs are provoked. Provocation of dizziness during differentiation testing suggests that it is not caused by a vestibular disorder.
2.3 Testing prior to manipulation or any treatment procedure involving end-range rotation

If cervical manipulation or any cervical treatment procedure involving end-range rotation is being considered, testing as outlined in Section 2.2 is recommended. The simulated manipulation position (pre-manipulative hold) is also recommended if manipulation is the proposed treatment. Because a patient’s vascular status may change between treatment sessions, testing should be undertaken on every occasion a cervical manipulation or any procedure involving end-range rotation is to be performed in an attempt to detect the patient for whom such treatments would be inappropriate as a result of provocation of symptoms or signs indicative of VBI.

Interpretation of findings

It is recommended that:

- If there is evidence at any time that symptoms or signs are clearly associated with VBI, cervical manipulation and mobilisation should not be undertaken and referral to a medical practitioner initiated.
- If there is evidence of unclear symptoms or signs potentially associated with VBI from either the history (subjective examination) or physical (objective) examination, cervical manipulation and any procedures involving end-range rotation should not be undertaken, although other mobilisation procedures may be applied provided the patient is carefully monitored. Because provocative testing is limited in its predictive validity for adverse neurovascular events, a report of symptoms potentially associated with VBI in the history (subjective examination) should be given greater weight in clinical decision-making than a negative test response.
- The physiotherapist should exercise sound clinical reasoning in applying these guidelines to individual patients and be aware that responses to provocative testing performed at subsequent treatment sessions may change.
- If an adverse neurovascular event occurs despite applying these guidelines then treatment should be immediately ceased, first aid practices implemented and emergency assistance sought.

Section 3 Assessment During and Following Treatment

During and following administration of any cervical manipulative procedure or any cervical treatment procedure involving end-range rotation, the physiotherapist must determine the presence or absence of symptoms and signs associated with VBI. Specific questioning about symptoms and observation for signs associated with VBI is essential at the following points during management:

- Immediately prior and subsequent to a cervical manipulative procedure, including assessment for a latent response.
- During and immediately subsequent to any cervical treatment procedure involving end-range rotation, including assessment for a latent response.
- During and immediately subsequent to any treatment of a patient who has reported symptoms associated with VBI in the history (subjective examination) or when such symptoms (or signs) are provoked during the physical examination, including assessment for a latent response.
- At subsequent visits enquiry should be made as to whether any symptoms or signs associated with VBI, or neck pain or headache suggestive of vertebral artery dissection has been experienced.

If symptoms or signs associated with VBI are provoked during or following treatment, the physical (objective) examination guidelines outlined in Sections 2.2 and 2.3 above should be applied prior to continuation with treatment.

If cervical manipulation is indicated, the risks associated with this procedure may be minimised by avoiding the following practices:

- Non-specific multisegmental procedures.
- Procedures involving upper cervical spine rotation, end-range cervical spine rotation or extension, or neck traction.
- Use of excessive thrusting force or range of movement.
- Multiple manipulations of the same or different cervical joints in any one treatment session.

It is recommended that cervical mobilisation be used initially with its effects assessed over at least 24 hours prior to the application of cervical manipulation.
Section 4  Consent: Provision of Information, Obtaining Consent and Recording

4.1 Provision of information

- It is essential that physiotherapists provide patients with information about proposed treatment procedures, in particular cervical manipulation or any cervical procedure involving end-range rotation.
- Information may be provided verbally by the physiotherapist, or preferably in an information sheet/brochure to ensure that the information is standardised. Such information, whether delivered verbally or in writing, must cover the following:
  - information about the proposed procedure
  - alternatives to the proposed procedure
  - benefits and risks of the proposed procedure and alternatives
  - the opportunity to ask questions
  - the opportunity to have adequate time to reflect on the information provided before agreeing to the proposed procedure
  - the opportunity for the patient to change their mind during the procedure (where practical).
- Provision of an information sheet/brochure is optional but allows the patient the opportunity to read about the proposed procedure at their own pace and formulate any questions. It can be given to the patient to read in the waiting room or clinic prior to treatment or to take home if the patient needs further time to decide whether to proceed.
- The physiotherapist must be prepared to verbally provide information beyond what is written in the information sheet/brochure if the patient requests further information, or if there is further information that the patient would likely consider important.
- Information provided about cervical manipulation should include the remote risks of stroke and death. Whilst the risk of death from cervical manipulation, as identified from review of the literature, appears to be less than that encountered in daily life, it is considered legally pertinent to mention the risk. Given this legal opinion the APA recommends that the information provided to the patient of the risks inherent in the procedure should include specific mention of the risk of death.
- The physiotherapist has a responsibility to ensure that the patient understands the information provided.

MPA has produced an information brochure entitled ‘Patient Information, Neck Mobilisation and Manipulation: The Facts Explained’ on the risks and benefits associated with cervical manipulation and mobilisation in which the above issues are essentially covered. Use of this brochure is recommended as an appropriate method of providing information to patients about cervical manipulation and mobilisation. The brochure is available from the APA website www.physiotherapy.asn.au or in hardcopy from MPA.

4.2 Obtaining informed consent

Informed consent is defined as ‘the voluntary and revocable agreement of a competent individual to participate in a therapeutic or research procedure, based on an adequate understanding of its nature, purpose, and implications’27. Informed consent where a patient explicitly indicates agreement (either verbally or in writing) following adequate provision of information about the proposed procedure (see Section 4.1) must be obtained:
- For cervical manipulation on each occasion a manipulative procedure is performed, even if the same procedure is repeated.
- For any cervical treatment procedure that involves end-range rotation on each occasion such a procedure is performed, even if the same procedure is repeated.

The physiotherapist may only ask for consent to proceed following the provision of information as outlined in Section 4.1 above. Consent is only valid if it is given freely and with an adequate understanding of what the procedure entails.
4.3 Recording informed consent

- Provision of information and obtaining of consent must be recorded in a standardised manner in the patient’s clinical notes at each treatment of cervical manipulation or any procedure involving end-range rotation. A stamp or sticker with the following information (available from the APA at www.physiotherapy.asn.au) is recommended to facilitate such recording:

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RECORD OF INFORMED CONSENT
Proposed treatment procedure: ___________________________

Method(s) used to provide information:  ☐ Verbal  ☐ Written

Discussion of treatment covered:
☐ What the treatment involves
☐ Potential benefits and risks of the proposed treatment
☐ Alternatives to the proposed treatment
☐ Opportunity for patient to ask questions
☐ Questions asked and answered
☐ Opportunity for patient to select alternative treatment

Signed (Physiotherapist): ________________________________
Date: _______________________________ Time: ___________

I confirm that:
• I have been adequately informed about the proposed treatment.
• I have understood the information provided.
• I consent to the proposed treatment.

Signed (Patient): _______________________________________
Date: _______________________________ Time: ___________
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- Each bullet point should be initialled by the physiotherapist, with care taken to record the date and time at which consent was given. This is particularly important if the physiotherapist needs to seek consent for more than one procedure in the one treatment session. It is essential that consent for each procedure is recorded separately.

- Whilst it is not legally necessary to obtain written consent from the patient for any cervical procedure, including manipulation, the APA recommends that the physiotherapist obtains signed consent prior to manipulation.

- It is also worth noting that some professional indemnity insurance policies require that signed consent be obtained prior to manipulation.

Disclaimer:

These clinical guidelines have been prepared having regard to general circumstances, and it is the responsibility of the practitioner to have express regard to the particular circumstances of each case, and the application of these guidelines in each case. In particular, clinical management must always be responsive to the needs of individual patients, resources and limitations unique to the institutions or type of practice. These clinical guidelines have been prepared having regard to the information available at the time of their preparation, and the practitioner should therefore have regard to any information, research or material which may have been published or become available subsequently. While the APA endeavours to ensure that clinical guidelines are as current as possible at the time of their preparation, it takes no responsibility for matters arising from changed circumstances or information or material which may have become available subsequently.
Appendix 1

Checklist for Use Prior to Spinal Manipulation


PATIENT’S NAME: ....................................................

DATE: ........................................................................

Manipulation is not usually considered an appropriate treatment for elderly patients, teenagers or children.

Screening consists of clearance by the treating physiotherapist by completing the following checklist, in addition to ensuring that:

a) APA Clinical Guidelines for Assessing Vertebrobasilar Insufficiency in the Management of Cervical Spine Disorders are followed prior to manipulation

b) Consent is gained

c) Vertebrobasilar insufficiency questionnaire is completed (cervical region only).

CHECKLIST FOR CONTRA-INDICATIONS (AND PRECAUTIONS) TO MANIPULATION

GENERAL

1. Presence of signs/symptoms that indicate serious pathology, ie:

   • is pain constant? ........................................ yes □ no □
   • is pain related to movement? ...................... yes □ no □
   • presence of severe spasm ............................ yes □ no □
   • presence of morning stiffness (> half hour) ...... yes □ no □
   • presence of severe night pain ........................ yes □ no □
   • presence of night sweats .............................. yes □ no □
   • history of cancer ........................................ yes □ no □
   • recent trauma/fracture ................................. yes □ no □

   Comments: ...........................................................................................................................................................
   .............................................................................................................................................................................
   .............................................................................................................................................................................

2. Presence of symptoms of spinal cord compromise:

   • non-dermatomal symptoms ......................... yes □ no □
   • ataxia or clumsiness ..................................... yes □ no □
   • increased reflexes ................................. yes □ no □
   • positive Babinski or clonus ..................... yes □ no □
   • non-myotomal muscle weakness ............... yes □ no □

   Comments: ...........................................................................................................................................................
   .............................................................................................................................................................................
   .............................................................................................................................................................................
3. **Presence of symptoms or signs of the following conditions:**

- active infection [yes] [no]
- active Scheuermann’s disease [yes] [no]
- osteoporosis/osteopaenia [yes] [no]
- pregnancy [yes] [no]
- advanced diabetes [yes] [no]
- inflammatory disease [yes] [no]

Comments: ...........................................................................................................................................................
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4. **Signs and symptoms suggesting possible spinal instability (eg RA of upper cervical spine):**

[yes] [no]

Comments: ...........................................................................................................................................................
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5. **Symptoms of acute spinal nerve/nerve root compromise:**

- dermatomal pain, paraesthesia [yes] [no]
- decreased reflexes [yes] [no]
- decreased muscle power (myotomal) [yes] [no]
- production of neurological signs [yes] [no]
- production of neurological signs or symptoms on spinal movement [yes] [no]

Comments: ...........................................................................................................................................................
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6. **Presence of a relevant recent soft tissue injury (eg whiplash):**

[yes] [no]

Comments: ...........................................................................................................................................................
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7. **Use of medication:**

- anti-depressants [yes] [no]
- oral steroids [yes] [no]
- anti-coagulant therapy [yes] [no]
- strong analgesics [yes] [no]
- muscle relaxants [yes] [no]
- opiates [yes] [no]

Comments: ...........................................................................................................................................................
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8. **Other contra-indications and precautions to manipulation:**

- non-mechanical pain [yes] [no]
- presence of psychiatric or depressive illness [yes] [no]
- other (eg spondylolisthesis, known disc disease) [yes] [no]

Comments: ...........................................................................................................................................................
.............................................................................................................................................................................
.............................................................................................................................................................................
9. **Presence of signs or symptoms of vertebrobasilar insufficiency (VBI):**
   - previous diagnosis of VBI: □ yes □ no
   - visual disturbances: □ yes □ no
   - dizziness or vertigo: □ yes □ no
   - blurred vision: □ yes □ no
   - diplopia: □ yes □ no
   - nausea: □ yes □ no
   - tinnitus: □ yes □ no
   - drop attacks: □ yes □ no
   - dysarthria: □ yes □ no
   - dysphagia: □ yes □ no
   - facial or intra-oral anaesthesia or paraesthesia: □ yes □ no
   - above symptoms aggravated by neck position or movement: □ yes □ no
   - previous possible VBI episode provoked by cervical manipulation: □ yes □ no

Comments: ...........................................................................................................................................................
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**SPECIFIC TO LUMBAR SPINE MANIPULATION**

10. **Presence of cauda equina syndrome:**
    - saddle anaesthesia or paraesthesia: □ yes □ no
    - sphincter dysfunction: □ yes □ no

Comments: ...........................................................................................................................................................
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**ARE FURTHER INVESTIGATIONS NECESSARY?**

*Please give further information about what investigations are required and why:*
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............................................................................................................................................................................
............................................................................................................................................................................

**SIGNATURE OF EXAMINER:** .................................................................

**DATE:** .............................................................................................
Appendix 2

Clinical Flowchart

A full-colour clinical flowchart is available with these clinical guidelines, to provide clinicians with an ‘at-a-glance’ reminder of the assessment procedure and the recommended practice following a given outcome at any stage of the process.

The clinical flowchart is available in hardcopy or PDF format. Please contact the Australian Physiotherapy Association to obtain a copy.
Appendix 3

References


Appendix 4

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