Introduction

This issue of the Journal includes a new feature: the ‘AJP Forum’. The Editorial Board envisions that this feature will be used from time to time to provide a venue for expert comment on issues of importance for physiotherapy practice. The first Forum examines issues related to pre-manipulative testing of the cervical spine. It follows the Australian Physiotherapy Association’s recent release of Clinical Guidelines for Pre-Manipulative Procedures for the Cervical Spine (Magarey et al 2000). The 2000 guidelines replace the protocol published in 1988.

Most readers of the Journal will have had some contact with clinical practice guidelines, as these have become more common in recent years. Clinical practice guidelines are designed to improve the quality of health care and decrease the use of unnecessary, ineffective or harmful interventions (NHMRC 1999). The Australian National Health and Medical Research Council advises that guidelines should be a distillation of current evidence and opinion on best practice (NHMRC 1999). In the past, guidelines were based upon the consensus of experts, but there is now recognition that this approach can produce limited and flawed guidelines. The NHMRC handbook (NHMRC 1999) suggests the following nine basic principles that should be followed when preparing clinical practice guidelines:

1. Processes for guideline development and evaluation should be outcome-focused.
2. Guidelines should be based upon the best available evidence and should include a statement about the strength of recommendations.
3. The method used to synthesise the available evidence should be the strongest applicable.
4. The process of guideline development should be multi-disciplinary and should include consumers.
5. Guidelines should be flexible and capable of adapting to varying local conditions.
6. Guidelines should be developed with resource constraints in mind.
7. Guidelines should be developed, disseminated and implemented taking into account their target audience.
8. The validity and usefulness of the guidelines should be evaluated.
9. Guidelines should be revised regularly.

There can be little argument that there is a need for guidelines on pre-manipulative testing of the cervical spine. Case reports of adverse events following cervical manipulation are particularly disturbing for those who practice manipulation. Cervical manipulation applied to patients in good health for relatively minor conditions such as cervical headache and neck pain has occasionally produced devastating adverse events such as quadriplegia, stroke or death. More alarming still are case reports of devastating adverse events that occurred even though the therapist reported following the 1988 guidelines for pre-manipulative testing. Not surprisingly, some trained manipulative physiotherapists choose not to manipulate the cervical spine.

What do the current guidelines advise? They advise that all patients who present with upper quadrant dysfunction should be screened for vertebrobasilar insufficiency by taking a focused history. Those patients with suspected vertebrobasilar insufficiency and those who are to undergo a high velocity thrust or end-range rotation technique require a more comprehensive interview and physical examination. The guidelines advise that as a minimum, the physiotherapist should perform sustained end-range cervical rotation and the movements the patient reports as linked to his or her vertebrobasilar insufficiency symptoms. Optional tests include cervical extension, cervical rotation with extension and positioning the patient’s neck in a simulated manipulation position. The guidelines advise that, if any of the physical examination procedures reproduces vertebrobasilar insufficiency symptoms, a test purported to differentiate dizziness arising from the vestibular apparatus from cervical vertigo and vertebrobasilar insufficiency should be performed. Lastly, the guidelines provide advice on assessment during and after treatment, and on gaining informed consent for cervical manipulation.

Each of the participants in the forum has been chosen because of his or her knowledge and interest in the area. The participants hold quite differing views on key issues related to pre-manipulative testing of the cervical spine. The Editorial Board of the Australian Journal of Physiotherapy feels that informed debate on this issue, initiated from within the Association, is a sign of maturity of the Australian physiotherapy profession. My view is that the Association’s ethical principles (Australian Physiotherapy Association 1999), that members shall respect the autonomy of the individual, cause no harm, advance the common good, and act fairly, are particularly relevant to a consideration of this issue.

My hope is that this forum will initiate collegial debate within the profession and a commitment to more research.
on this important topic. Research and debate are the only way to provide a better understanding of what can be done to prevent accidents following cervical manipulation.

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References

The Musculoskeletal Physiotherapy of Australia position on pre-manipulative testing for the cervical spine

The MPA undertook a survey of its members in 1997 to determine their compliance with and opinion of the APA Protocol for Pre-Manipulative Testing of the Cervical Spine (Magarey et al 2000a. Magarey et al submitted-a). As a result of that survey and a comprehensive literature review, the MPA developed a new set of guidelines for pre-manipulative procedures for the cervical spine (Magarey et al 2000b, Magarey et al submitted-b).

The new guidelines were the result of a comprehensive consultative process. This included incorporating membership survey results, and consulting with VBI research experts, medico-legal experts and numerous APA committees. The current literature related to vertebral artery flow was reviewed with particular emphasis on the incidence of adverse effects of cervical manipulation and the legal issues related to informed consent. While the membership strongly supported maintenance of a guideline by the profession, their feedback encouraged revision reducing the length and incorporating research. Evidence is available on links between specific symptoms and vertebral artery dysfunction. However, only estimates on the safety of cervical manipulation and the efficacy of the current physical testing for VBI related dysfunction are currently available.

There has not yet been a legal test case against a physiotherapist that would help to determine the most appropriate guidelines in relation to informed consent. However, more stringent guidelines regarding informed consent were recommended, based on extrapolation from legal judgments made recently in relation to other health practitioners.

The MPA concluded that continued support for screening procedures, both subjective and physical, prior to cervical manipulation was essential for and supported by the profession. Such guidelines allow a degree of clinical reasoning, rather than following the previous rigid rules, of which the profession was non-compliant. The MPA also feels strongly that the profession has an urgent ethical and legal obligation to emphasise the issues of informed consent related to cervical manipulation.

The Clinical Guidelines for Pre-Manipulative Procedures for the Cervical Spine are available from the APA National Office.

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References

Are we on the right track?

We applaud Musculoskeletal Physiotherapy Australia for the formulation of the new pre-manipulative guidelines. The new guidelines are a step forward from the previous protocol because they allow individual practitioners choice when making clinical decisions. The previous protocol proved to be legally challenging and further increased practitioners’ fear of manipulating.

The increasing emphasis on a thorough subjective interview is encouraging, and reinforces the requirement for a competent level of clinical reasoning. With the previous protocol it appears that a majority of clinicians placed a greater emphasis on the physical examination. The recent work of Rivett and colleagues (2000) has demonstrated how variable the physical tests can be. A review of four recent New Zealand cases of adverse reactions to manipulation found that in three of the four cases, the clinician had insufficiently weighed subjective
evidence before deciding on manipulation as part of the clinical management.

It is not clear what type of techniques were applied to produce these adverse reactions, nor how well the techniques were applied. If you apply manual procedures to your clients, when did you last review your own techniques?

Have the pre-manipulative procedures exaggerated the risks of manipulation? Reports of risk of stroke following manipulation vary from 1:1,000,000 to 1:163,000 (Rivett and Reid 1998). A manipulative physiotherapist who manipulates three or four upper cervical spines per week will not perform 163,000 manipulations in a practising lifetime.

The new guidelines may meet with greater compliance as a result of the changes. The requirement for a thorough subjective examination emphasising a high level of clinical reasoning is essential. Perhaps there should be an equally strong emphasis on the need for a high level of technical skill and application in performing the manipulation.

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References


Pre-manipulative testing: predicting risk or pretending to?

Clinical practice guidelines should be evidence-based and useful. Unfortunately, the APA guidelines largely are not. Their recommendations include:

History taking: It is prudent to avoid cervical manipulation in patients with pre-existing cerebrovascular disease, whether vertebralbasilar or carotid in location. The guidelines give a list of possible vertebralbasilar symptoms, including neck pain and headache. They do not, and perhaps cannot, provide accurate discriminative information, since the list is open-ended and contains many non-specific symptoms. Furthermore, many stroke victims have been young adults without obvious risk factors or warning symptoms.

Examination: Screening tests should be valid and reliable predictors of risk. Pre-manipulative provocative testing has neither of these qualities, with available scientific evidence failing to show predictive value or justify its use (Cote et al 1996, Di Fabio 1999, Licht et al 2000). Testing does not determine that manipulation will be safe. Briefly sustained end of range movements and the other manoeuvres described (with or without Doppler) cannot reliably determine the safety of cervical manipulation proper, after which arterial dissection and intimal contusion with thrombosis can occur, rather than simply transient flow changes related to neck position. Yet provocative testing is recommended by the APA guidelines, including for those with pre-existing symptoms and in whom riskier techniques are planned.

Screening procedures should not be harmful. However, provocative testing may have some risk. There is a case for avoiding end-range cervical rotation of any kind (screening or manipulation proper) in patients with cerebrovascular symptoms. Yet in these patients, the guidelines promote most rigorous provocative testing.

Informed consent: This is the last but strongest element of the guidelines. The patient has the right to know the nature of his or her problem and treatment options with potential risks and benefits. Patients need to be informed of the small but significant risk of serious complications, including stroke, and their unpredictable occurrence. Treatment should also have proven benefit that outweighs any risks. Adequately informed patients may decide to avoid cervical manipulation with end-range rotation techniques and/or high-velocity thrust techniques, since no scientific evidence favours these over other available physical techniques.

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Do the guidelines do what they are supposed to?

The unwritten purpose of the guidelines appears to be to reduce risk to patients of cervical manipulation and to provide legal indemnity to physiotherapists. Do the guidelines achieve this purpose?

Do the guidelines decrease risk from manipulation? To be effective, the guidelines must address all known and potential risk factors. Despite this, only symptoms of vertebralbasilar insufficiency (eg dizziness) are mentioned
in the guidelines, whereas the potential risk factors of neurological disorders, systemic inflammatory, infectious and malignant diseases, use of selected medications and disordered mental status are not mentioned, but could be identified through simple questioning.

In the physical examination, the guidelines recommend performance of sustained rotation in addition to the routine tests. Further “additional” or optional tests include extension, rotation combined with extension, and the simulated manipulation position. Inclusion of these tests was based on evidence that blood flow could be reduced in the vertebral and internal carotid arteries during extension and rotation, but the tests’ validity for reducing risk from manipulation is unknown.

**Do the guidelines reduce physiotherapists’ legal liability?**

The guidelines do not constitute a legally binding document. However, because they have been endorsed by the APA Board of Directors they may be considered legally to reflect the standard of care expected of a competent physiotherapist performing cervical manipulation. Such guidelines may therefore form the basis of expert opinion about minimum safety requirements. Nevertheless, because the decision to manipulate relies heavily on clinical reasoning, a physiotherapist could still be held liable in the event of an accident, despite having adhered to the guidelines. Thus, adherence to the guidelines does not, of itself, make a manipulation safe.

Thus, although some patients at risk from cervical manipulation may be identified by application of the new guidelines, the guidelines do not, in general, achieve their purpose. Ultimately, clinicians must rely on clinical reasoning to judge the wisdom of manipulating a particular patient.

**A valid pre-manipulative screening tool is needed**

The Australian Physiotherapy Association’s Clinical Guidelines for Pre-Manipulative Procedures for the Cervical Spine represent a positive step towards the goal of reducing the incidence of vertebrobasilar strokes following neck manipulation. Nevertheless, the predictive value of the guidelines is largely contingent upon the validity of the physical screening tests, particularly sustained end-range cervical rotation. The primary issue is the sensitivity of the tests for detecting patients with vertebral artery occlusion and vertebrobasilar insufficiency, and who are at high risk of experiencing significant forces during manipulation which could result in intimal dissection.

Recently, Rivett et al (2000) used duplex ultrasound with colour Doppler flow and power Doppler imaging capabilities to measure vertebral artery haemodynamic parameters at the atlanto-axial region during pre-manipulative testing in 100 patients classified as either positive or negative to clinical testing. It was found that there were no significant differences in haemodynamic changes in any of the test positions (including end-range rotation) between the two groups. Furthermore, 20 patients exhibited total occlusion or partial occlusion (no diastolic flow) during testing, but only two patients reported potential ischaemic symptoms at the time. It was concluded that pre-manipulative tests are usually incapable of distinguishing between patients with varying degrees of flow impedance and are therefore unlikely to detect the patient at risk of stroke. Clearly, further research into alternative screening tools is urgently needed.

**Guidelines for pre-manipulative testing of the cervical spine - an appraisal**

**Are the guidelines valid?**

It is not clear if recommendations were derived from evidence of high quality or from evidence that is much more liable to error. The majority of evidence is based on low level evidence; that is, physiology, bench research, or “first principles” (Sackett et al 2000). Studies of moderate level evidence, where inappropriate sampling and a narrow spectrum of study individuals was used, revealed vertebrobasilar insufficiency tests to be invalid. Information on the validity of the diagnostic studies, their accuracy, and detailed instruction for applying that evidence to our patients (Sackett et al 2000) was not reported in the guidelines.
Is the pretest probability too low to warrant implementation of the tests? Will the clinician say to the patient after having done verteobasilar insufficiency tests, “I still don’t know if a manipulation will or won’t harm you” The pre-test likelihood of occluding or dissecting the vertebral artery that result in harm appears to be extremely low (estimates of serious complication from manipulation begin at 1 in 20,000; Hurwitz et al 1996). Even if verteobasilar insufficiency tests were highly sensitive and specific, the diagnostic test should not be done if the patient is unlikely to have the target disorder and the test result would not alter the clinical decision. Most of the people who test positive would not be harmed even if they were manipulated. The decisions differ when the pre-test likelihood is higher; that is, when there is a history indicating caution such as neurological involvement and trauma. The decision would then be to test and treat on the basis of the test’s result. Finally, there are situations were we ought to assume that the patient has the disorder (multiple subjective factors like drop attacks, positive neurological findings, 5 “Ds”) and avoid the test and treatment.

Will the reference standards that assess blood flow velocity and occlusion accurately detect verteobasilar artery dissection or occlusion causing a stroke or death? The notion that verteobasilar insufficiency/blood flow reference tests (ie Doppler sonography) accurately assess the adequacy of extracranial vessels may be only partially correct or flawed. Other theories such as a genetic predisposition in tissue type resulting in arterial anomalies may assist in establishing an accurate reference standard (Norris et al 2000).

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Influence of vertebral artery blood flow research outcomes on clinical judgment

There has been substantial additional research into the effects of cervical movements on vertebral artery blood flow since 1988, when the APA first formalised a Protocol for Pre-Manipulative Testing of the Cervical Spine and recommended its use in patients with upper quarter dysfunction. The development of duplex Doppler ultrasound equipment with colour enhancement, which allows measurements of velocity and flow rate of vertebral artery blood flow, has resulted in a burgeoning of in-vivo blood flow studies.

The outcomes of this research have been conflicting at best and have called into question not only the methodology employed in some instances (Johnson et al 2000) but also the sensitivity and specificity of premanipulative testing, in terms of the ability of these tests to alter blood flow parameters in clinically significant ways in patients versus controls (Licht et al 2000, Rivett et al 1999).

Importantly, what has not been called into question is the ability of the clinician to produce, reproduce and/or independently replicate symptoms in patients which might be suggestive of verteobasilar insufficiency, that is to reliably categorise patients as positive or negative on clinical testing (Licht et al 2000, Rivett et al 1999).

Despite conflicting results of vertebral artery blood flow studies, Licht et al found that the majority of Danish chiropractors surveyed would manipulate patients with a positive de Kleyns test if vascular tests (vertebral and internal carotid artery blood flow measures) were considered normal. A positive de Kleyns test has long been regarded by that profession as a contraindication to cervical manipulation. Despite conflicting results too, the new clinical guidelines include sustained end-range rotation as the only minimum mandatory screening test prior to cervical manipulation, with additional cervical movement tests included based upon the physiotherapist’s clinical judgment or the patient’s nomination.

Using the reliable and comprehensive blood flow procedures of Johnson et al (2000), there is now great opportunity and urgent need to establish the effects not only of cervical movements on vertebral artery blood flow but also the effects of high velocity thrust techniques and end-range rotation mobilisation techniques, thereby contributing to clinical decision making and biomedical knowledge.

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References