Manipulative practice in the cervical spine: a survey of IFOMPT member countries

Lisa Carlesso¹, Darren Rivett²

¹Department of Clinical Epidemiology and Biostatistics, McMaster University, Hamilton, Ontario, Canada

²School of Health Sciences, The University of Newcastle, Australia

The International Federation of Orthopaedic Manipulative Physical Therapists (IFOMPT) aims to achieve worldwide promotion of excellence and unity in clinical and academic standards for manual and musculoskeletal physical therapists. To this end, IFOMPT has sponsored several conference panel sessions and a survey of Member Organizations (MOs) and Registered Interest Groups (RIGs) regarding current cervical spine manipulation and pre-manipulative screening practice in each country. The purpose of this study was to determine common elements of cervical spine manipulative practice and pre-manipulative screening between countries. In late 2007, a questionnaire investigating recommended pre-manipulative screening protocol/guideline use, informed consent regarding risks, screening procedures, and treatment/manipulation technique was sent to all twenty MOs and five RIGs. The response rate was 88%. The main findings of the survey included: 77% of respondent organizations use pre-manipulative guidelines, with Australian guidelines the most frequently adopted internationally (36%); recommendations concerning the provision of information about the possibility of serious adverse events is not standard practice in all countries (50%); positional tests for vertebrobasilar insufficiency are used by all respondent organizations; craniovertebral ligament testing is sometimes taught as a pre-manipulative screening tool (36%); the use of upper cervical spine manipulation has declined in some countries (41%); and of the respondent organizations that continue to teach upper cervical manipulation, most (70%) minimize the rotation component. The findings of this research will inform an IFOMPT international standard for screening the cervical region prior to orthopaedic manual therapy intervention. The development of an IFOMPT endorsed document will be of assistance to manual therapy clinicians worldwide in safely managing disorders of the cervical spine.

Keywords: Manipulation, Spinal, Physical therapy (specialty), Vertebrobasilar insufficiency, Neck pain

Introduction

The International Federation of Manipulative Physical Therapists (IFOMPT) has maintained a vision of promoting excellence and unity in clinical and academic standards for orthopaedic manual physical therapists since its formation in 1974.¹ It was with this guiding principle in mind, that an education session was held at the World Confederation for Physical Therapy International Congress in Vancouver 2007. This discussion was warranted given the growing attention both in the peer reviewed literature²⁻⁴ and in the public domain,⁵⁻⁷ on the rare but severe adverse events related to cervical spine manipulation. The session was well received as cervical spine manipulation and its potential adverse outcomes are arguably a concern for any practitioner employing high velocity low amplitude (HVLA) thrust techniques in the cervical spine.

Reports of vertebral artery dissection related to cervical manipulation are well documented in the literature. In recent years, studies assessing the risk for vertebrobasilar insufficiency (VBI) have employed stronger methodology.⁸⁻¹⁰ While a definitive figure has been elusive, the evidence indicates the risk is very low.^{8,10,11} Further, we are challenged by the fact that screening studies investigating the use of Doppler ultrasound in evaluating vertebral artery blood flow have been unable to consistently demonstrate adequate reliability;¹²⁻¹⁴ however, recent evidence suggests that rotational movements may have the greatest influence upon blood flow.¹⁵⁻¹⁸ Despite these unknowns, there is a growing body of evidence for the effectiveness of cervical manipulation within a multimodal approach¹⁹⁻²¹ and for particular subgroups of patients.^{22,23} Thus when considering the risks and benefits of using cervical manipulation as a treatment, practitioners are faced with less certainty regarding the occurrence of adverse events compared to the moderate

Correspondence to: L Carlesso, Department of Clinical Epidemiology and Biostatistics, McMaster University, Hamilton, Ontario, Canada. Email: carlesl@mcmaster.ca

evidence for its effectiveness. In light of the potential for rare but serious outcomes, we must act responsibly and take action to address the safety of our practice both for our profession and our patients. It was in keeping with this duty that IFOMPT undertook the presentation of another education session on this topic for its members at their 2008 conference in Rotterdam, The Netherlands.

IFOMPT aims to work towards international unity and conformity of educational standards of practice amongst manual and musculoskeletal physical therapists.¹ Consequently, the development of an international consensus document addressing manual and manipulative practices in the cervical spine was identified as a key objective at the Rotterdam conference. As a starting point, a survey of member organizations' practices around HVLA techniques in the cervical spine was designed to inform the discussion of the consensus document. The purpose of this study was to determine common elements of cervical spine manipulative practice and pre-manipulative screening between member organizations.

Method

A cross sectional survey was developed for administration to all current IFOMPT member organizations (MOs) and registered interest groups (RIGs) (see Table 1). Questions were focused on the processes involved in the teaching and clinical utilization of HVLA techniques and their relationship to adverse events. Consultation with existing guidelines and the

literature²⁴ informed construction of the survey instrument. Expert comment was sought from the IFOMPT Executive Committee and the Standards Committee as part of the questionnaire's development. The survey was conducted over a two month period from September to November 2007. The MO or RIG representative for each country answered the questionnaire. MOs have full recognition within IFOMPT, while RIGs are in the process of becoming recognized. At the time of survey administration there were twenty MOs and five RIGs. The questionnaire was sent electronically to representatives of each MO or RIG respectively. It contained a cover letter outlining the purpose of the survey and a questionnaire consisting of fifteen items across five categories. The categories were as follows: demographic information, pre-manipulative screening protocol and guideline use, informed consent regarding risks, screening procedures, and manipulation techniques taught. It was felt that these categories provided a breadth of information from which the consensus document could be developed. With the exception of the demographic section, the substantive questions utilized closed-ended response formats with an 'unknown' option in the informed consent/risks and treatment/manipulation technique sections. Descriptive statistics were used to summarize the group results. Fisher's exact tests were used to analyze bivariate relationships of interest, with the strength of association reported as odds ratios with

Table 1 Survey questions

Demographic information

1. Is your organization an IFOMPT full Member Organization (MO) or a Registered Interest Group (RIG)?
2. How many members in your MO are recognized by IFOMPT?

Pre-manipulative screening guideline/protocol use

3. Does your MO/RIG have its own guideline or protocol for pre-manipulative screening before performing cervical manipulation?
4. If you **do not** have your own guideline or protocol, do you follow one from another country?

Informed consent/risks

5. Does your MO/RIG have an information sheet to give to patients about cervical manipulation and its related risks?
6. Does your MO/RIG recommend that therapists tell patients about the small risk of stroke or death related to cervical manipulation?
7. Does the law in your country **require** the therapist to tell a patient about the small risk of stroke or death before manipulating their neck?
8. Have there been any cases in your country of stroke related to cervical spine manipulation performed by a manipulative physiotherapist?

Screening

- The literature reports mixed results regarding the validity of the VBI screening positions of cervical spine extension and rotation.
9. Does your MO/RIG continue to teach the VBI screening tests involving extension and rotation?
  10. Does your MO/RIG recommend the use of the sustained pre-manipulative position as a screening test?
  11. Does your MO/RIG teach other pre-manipulative screening tests?

Treatment/manipulation technique

12. Have your members decreased the use of manipulation in the upper cervical spine in the last 10 years?

Many of the case reports in the literature of adverse responses related to cervical manipulation have occurred in the upper cervical spine.

13. Does your MO/RIG continue to teach upper cervical manipulations?
14. Does your MO/RIG teach upper cervical spine manipulations involving end-range rotation?
15. Has your MO/RIG changed the manipulation techniques it teaches by limiting the amount of rotation used?

95% confidence intervals. All statistical analyses were performed using PASW (PASW Statistics 18; SPSS Inc., IL, USA).

Results

The response rate was 88%, with all twenty MOs responding in addition to two of the five RIGs. MO membership consisted of seven (35%) with <100 members, eight (40%) between 101 and 399, and five (25%) with >400.

Pre-manipulative screening guideline and protocol use

The majority (77%, $n=17$) of respondent organizations used a pre-manipulative guideline or protocol, with seven countries using a self-developed guideline. Larger MOs (>200 members) were more likely (OR=13.5, 95%CI 1.2–152.2) to have developed a pre-manipulative guideline compared to MOs with less members ($P=0.057$). Eight (47%) of the organizations that used a pre-manipulative guideline or protocol used those developed in Australia.²⁵

Informed consent

Four (18%) countries stated that they had a patient information sheet detailing the potential risks associated with cervical manipulation. Half ($n=11$) of the respondent organizations recommend that therapists inform patients about the risk of stroke. Forty-one per cent ($n=9$) recommend informing patients about the risk of death. Organizations that utilized their own guidelines for pre-manipulative screening were more likely (OR=24, 95%CI 2–283) to advise therapists to explicitly inform patients regarding the risk of death ($P=0.007$). Five countries (Australia, Canada, New Zealand, The Netherlands and the United Kingdom) reported that they were legally required to inform a patient about the risk of stroke or death before proceeding with a cervical manipulation. Three MOs were aware of cases of stroke attributed to a manipulative physical therapist in their country.

Screening procedures

All respondent organizations recommended the use of positional tests for VBI screening, particularly in the pre-manipulative position (95%, $n=21$). Eighty-six per cent ($n=19$) of MOs and RIGs also recommended that therapists use VBI screening tests involving positions of cervical extension and/or rotation. Craniocervical ligament testing prior to cervical spine manipulation was recommended by 36% ($n=8$) of respondent organizations.

Use of manipulation

Several MOs and RIGs (41%, $n=9$) indicated that the use of upper cervical manipulations had decreased in the last 10 years in their respective countries, although the large majority (91%, $n=20$) continued

to teach these techniques. Of the organizations that continue to teach upper cervical manipulation, 70% ($n=14$) indicated that they had modified their techniques to minimize the amount of rotation used.

Discussion

The survey response rate was very high and importantly included all IFOMPT MOs. A majority of those surveyed (77%) use guidelines as a means of trying to standardize the practice and teaching of safe cervical spine manipulation in their country. The most frequently used guideline was reported to be the 'Clinical Guidelines for Assessing Vertebrobasilar Insufficiency in the Management of Cervical Spine Disorders' of the Australian Physiotherapy Association.²⁵ These findings indicate an existing convention among many IFOMPT members to adhere to a standard in this area of clinical practice. This despite the use of premanipulative guidelines being questioned due to inconsistency in the literature regarding areas such as identification of risk factors, validity of premanipulative positional testing and cardinal signs for VBI.²⁶ Some recent reviews call for utilization of a vascular differential diagnostic framework combined with a comprehensive knowledge of potential risk factors for cervical arterial dysfunction.^{26,27}

In contrast, there appears to be less convention concerning the provision of information to patients regarding the risk of a serious adverse event. Only half of MOs and RIGs recommended that therapists explicitly tell patients about the risk of stroke and/or death related to cervical spine manipulation. These differences may possibly reflect the current uncertainty regarding the event-rate of serious adverse consequences, the current inability to accurately identify patients with differing degrees of risk with cervical manipulation, in addition to international differences in medicolegal requirements.

All respondent organizations recommended positional screening procedures for VBI, with the pre-manipulative hold position used most commonly. Two MOs commented that they no longer used positional tests involving extension, but continued to use rotation. This finding is notable as there is conflicting evidence in the literature from Doppler ultrasound studies regarding the validity of these tests;²⁸ however, evidence suggests that rotation does influence blood flow in the vertebral artery in some individuals.^{12,26} There are also published reports of (false) negative tests despite known dysfunction.²⁹ The use of craniocervical ligament testing by about a third of respondent organizations is interesting. These tests have long been taught and purported to determine the stability of the upper cervical vertebrae.^{30,31} However, recent evidence has highlighted that these tests are not used consistently and some physical therapists may be

resistant to pre-manipulative screening guidelines that provide a blanket recommendation to perform these tests.³²

Finally, the other outcome of interest concerns the use and teaching of manipulation in the upper cervical spine. Forty-one per cent of respondent organizations acknowledged a decrease in use of upper cervical spine manipulation over the past decade. This may relate to the increased media attention and resultant public awareness of the rare adverse outcomes associated with manipulation of this region. This would parallel the findings of a recent survey of Canadian manipulative physiotherapists.³³ Teachings of the techniques have also been modified, with 70% of MOs and RIGs indicating that they limit the amount of cervical rotation used. Considering a plausible rationale for such a change, one might theorize that it is in response to the Doppler ultrasound studies that have found cervical rotation to have an occluding effect on the vertebral artery¹⁷ and that techniques involving an element of rotation are reported in many case reports of adverse events following cervical spine manipulation.³⁴

The main limitation to this work is in the respondents. It was not feasible to survey all members of every MO and RIG. It is recognized that each country's representative who completed the questionnaire is a proxy for many people and therefore their answers may be lacking detail. It is also possible that there may be some discrepancies between what the representative for the respective country understands and what it actually practised by the members of that country's organization.

Conclusions

Considering the original mission statement of IFOMPT to work towards international unity of educational practice standards and the fact that most of its membership is using an existing guideline²⁵ regarding cervical manipulation, it appears the time is right for moving towards an international consensus. Australia was the first to produce such guidelines in 1988³⁵ and has updated them regularly^{25,36,37} in response to research findings and the needs of its members.²⁴ With almost half of the respondent organizations that utilize pre-manipulative guidelines adopting those developed within Australia, we suggest that these guidelines could be used as a starting point for discussion and development of an international consensus document.

In consideration of our findings, our international community and supporting literature, we suggest the following as initial points of discussion for the document. Regarding screening procedures, we propose that at the least the sustained pre-manipulative position test for VBI be included. Further, information

should be provided on the presentation and assessment of craniovertebral instability. Recommendations concerning informed consent need to be flexible to accommodate regional differences in medicolegal requirements and information on preferred manipulative practices should be provided. In summary, an international consensus document on cervical spine manipulation needs to be reflective of best practice and research, flexible and simple in application, legally suitable to individual countries, and informative but not prescriptive.

References

- 1 International Federation of Orthopaedic Manipulative Physical Therapists. Vision [accessed 2010 June]. Available from: <http://www.ifompt.com/About+IFOMPT/Vision.html>. 2008.
- 2 Refshauge KM, Parry S, Shirley D, Larsen D, Rivett DA, Boland R. Professional responsibility in relation to cervical spine manipulation. *Aust J Physiother* 2002;48:171-9.
- 3 Jull G, Magarey M, Niere K, Elvey R. Physiotherapy, a responsible profession to use cervical manipulation. Response to Refshauge *et al.* *Aust J Physiother* 2002;48:180-3.
- 4 Refshauge KM, Parry S, Shirley D, Larsen D, Rivett DA, Boland R. Professional responsibility means responding professionally: response to comment by Jull *et al.* *Aust J Physiother* 2002;48:183-5.
- 5 Laurance J. Manipulation for back and neck pain 'carries stroke risk'. *The Independent*, 13 March 2001.
- 6 McKie R. Alternative therapy for backache 'can kill or disable'. *The Observer*, 23 September 2007.
- 7 Chiropractic treatment needs safety review: jury. CBC News, 2004.
- 8 Cassidy JD, Boyle E, Cote P, He Y, Hogg-Johnson S, Silver FL, *et al.* Risk of vertebrobasilar stroke and chiropractic care: results of a population-based case-control and case-crossover study. *Spine* 2008;33:S176-83.
- 9 Rubinstein SM, Leboeuf-Yde C, Knol DL, de Koekkoek TE, Pfeifle CE, van Tulder MW. The benefits outweigh the risks for patients undergoing chiropractic care for neck pain: a prospective, multicenter, cohort study. *J Manipulative Physiol Ther* 2007;30:408-18.
- 10 Rothwell DM, Bondy SJ, Williams JI. Chiropractic manipulation and stroke: a population-based case-control study. *Stroke* 2001;32:1054-60.
- 11 Thiel HW, Bolton JE, Docherty S, Portlock JC. Safety of chiropractic manipulation of the cervical spine: a prospective national survey. *Spine* 2007;32:2375-8; discussion 9.
- 12 Thomas LC, Rivett DA, Bolton PS. Validity of the Doppler velocimeter in examination of vertebral artery blood flow and its use in pre-manipulative screening of the neck. *Man Ther* 2009;14:544-9.
- 13 Johnson C, Grant R, Dansie B, Taylor J, Spyropoulos P. Measurement of blood flow in the vertebral artery using colour duplex Doppler ultrasound: Establishment of the reliability of selected parameters. *Man Ther* 2000;5:21-9.
- 14 Rivett DA, Sharples KJ, Milburn PD. Reliability of ultrasonographic measurement of vertebral artery blood flow. *N Z J Physiother* 2003;31:119-28.
- 15 Mitchell J. Is mechanical deformation of the suboccipital vertebral artery during cervical spine rotation responsible for vertebrobasilar insufficiency? *Physiother Res Int* 2008;13:53-66.
- 16 Mitchell J, Kramschuster K. Real-time ultrasound measurements of changes in suboccipital vertebral artery diameter and blood flow velocity associated with cervical spine rotation. *Physiother Res Int* 2008;13:241-54.
- 17 Mitchell J. Vertebral artery blood flow velocity changes associated with cervical spine rotation: a meta-analysis of the evidence with implications for professional practice. *J Man Manip Ther* 2009;17:46-57.
- 18 Rivett DA, Sharples KJ, Milburn PD. Effect of premanipulative tests on vertebral artery and internal carotid artery blood flow: a pilot study. *J Manipulative Physiol Ther* 1999;22:368-75.

- 19 Gross A, Miller J, D'Sylva J, Burnie SJ, Goldsmith CH, Graham N, *et al.* Manipulation or mobilisation for neck pain. *Cochrane Database Syst Rev* 2010;CD004249.
- 20 Gross A, Goldsmith C, Hoving J, Haines T, Peloso P, Aker P, *et al.* Conservative management of mechanical neck disorders: a systematic review. *J Rheum* 2007;34:1083–102.
- 21 D'Sylva J, Miller J, Gross A, Burnie SJ, Goldsmith CH, Graham N, *et al.* Manual therapy with or without physical medicine modalities for neck pain: a systematic review. *Man Ther* 2010;15:415–33.
- 22 Tseng YL, Wang WTJ, Chen WY, Hou TJ, Chen TC, Lieu FK. Predictors for the immediate responders to cervical manipulation in patients with neck pain. *Man Ther* 2006;11:306–15.
- 23 Thiel HW, Bolton JE. Predictors for immediate and global responses to chiropractic manipulation of the cervical spine. *J Manipulative Physiol Ther* 2008;31:172–83.
- 24 Magarey ME, Rebbeck T, Coughlan B, Grimmer K, Rivett DA, Refshauge K. Pre-manipulative testing of the cervical spine review, revision and new clinical guidelines. *Man Ther* 2004;9:95–108.
- 25 Rivett DA, Shirley D, Magarey M, Refshauge K. Clinical guidelines for assessing vertebrobasilar insufficiency in the management of cervical spine disorders. Melbourne: Australian Physiotherapy Association; 2006.
- 26 Kerry R, Taylor AJ, Mitchell J, McCarthy C. Cervical arterial dysfunction and manual therapy: a critical literature review to inform professional practice. *Man Ther* 2008;13:278–88.
- 27 Kerry R, Taylor AJ. Cervical arterial dysfunction: knowledge and reasoning for manual physical therapists. *J Orthop Sports Phys Ther* 2009;39:378–87.
- 28 Mitchell J. Doppler insonation of vertebral artery blood flow changes associated with cervical spine rotation: implications for manual therapists. *Physiother Theory Pract* 2007;23:303–13.
- 29 Westaway MD, Stratford P, Symons B. False-negative extension/rotation pre-manipulative screening test on a patient with an atretic and hypoplastic vertebral artery. *Man Ther* 2003;8:120–7.
- 30 Pettman E. Stress tests of the craniovertebral joints. In: Boyling JD, Palastanga N, editors. *Grieve's modern manual therapy*. Edinburgh: Churchill Livingstone; 1994. p. 529.
- 31 Aspinall W. Clinical testing for the craniovertebral hypermobility syndrome. *J Orthop Sports Phys Ther* 1990;12:47–54.
- 32 Osmotherly PG, Mercer SR, Rivett DA. The knowledge and use of craniovertebral instability testing by Australian physiotherapists. 9th International Conference of the International Federation of Orthopaedic Manipulative Therapists; 2008 June 8–13; Rotterdam, The Netherlands.
- 33 Carlesso L, Bartlett D, Padfield B, Chesworth B. Cervical manipulation and informed consent: Canadian manipulative physiotherapists opinions on communicating risk. *Phys Can* 2007;59:86–96.
- 34 Rivett DA. Adverse effects of cervical manipulative therapy. In: Boyling JD, Jull GA, editors. *Grieve's modern manual therapy the vertebral column*. Edinburgh: Churchill Livingstone; 2004. p. 534–6.
- 35 Australian Physiotherapy Association. Protocol for pre-manipulative testing of the cervical spine. Approved by the House of Delegates, 26th–27th March, 1988. *Aust J Physiother* 1988;34:97–100.
- 36 Australian Physiotherapy Association. Testing of the cervical spine prior to manipulation. *Physiother Pract* 1989;5:207–11.
- 37 Australian Physiotherapy Association. Clinical guidelines for pre-manipulative procedures for the cervical spine. Melbourne: Australian Physiotherapy Association; 2000.