

SCIENTIFIC

PHYSICAL THERAPY

Cervical Spine Manipulation For The Treatment Of Cervicogenic Headache: A Modified Extensive Literature Review

By

Brent A Harper, PT, DMT, DPT, OCS, FAAOMPT

Purpose

Determine the efficacy of spinal manipulation on patients with cervicogenic headache in relation to quality of life, intensity and frequency of cervicogenic headache, and articular mobility (ROM).

In order to accomplish the purpose of this study a modified extensive review of current literature was performed.

Methodology

For the purpose of this study, the research design involved an inductive analysis of the literature that addressed manipulative therapy of the cervical spine a physical therapy treatment of cervicogenic headache.

A 5-step process was followed: a literature search was conducted to identify information; copies of articles were identified and obtained; a synopsis of each article was written; notes were written on each of the synopses; and a narrative statement was written.

In this issue:

- **Risk Factors for Lumbar Disc Degeneration** By Didrik J. Sopleer Ph.D., L.Ac.

Abstracts:

- **Cervical Spine Manipulation for the Treatment of Cervicogenic Headache: A Modified Extensive Literature Review.** By Brent A. Harper, PT, DMT, DPT, OCS, FAAOMPT
- **The Relationship between Participation in a Manual Therapy Treatment Program and Changes in Cervical Range of Motion and Dizziness, in Patients with Suspected Servicogenic Dizziness.** By Frank L. Gargano, DPT
- **The Role of the Lumbar Multifidus in Manual Therapy In Patients with Chronic Low Back Pain and Lumbar Segmental Instability.** By Alec G. Kay, DPT

Words used for the article search in MEDLINE and CINAHL included “headache,” “cervicogenic headache,” “manipulation,” “cervical manipulation,” “physical therapy,” “manual therapy,” “quality of life,” and “articular mobility.” All articles were searched, but only English language articles were obtained because English abstracts of non-English articles indicated irrelevance to the topic. The search included all years available in both search engines. Emphasis was placed on articles published in the last 5 years, as well as on historically significant articles. Additional articles were found through the references in articles gathered in the initial search.

Findings

The manual therapy treatment of choice was mobilization rather than manipulation. Intraexaminer passive segmental mobility testing was supported by the literature, but the reliability of interexaminer testing remained debatable. Despite this, current research supported the reliability of interexaminer categorization of those suffering from cervical headache. Interexaminer reliability was reliable in those suffering from cervicogenic headache as described by Sjaastad, et al.

There was a lack of quality studies on the efficacy of cervical spine manipulation. Manipulation in conjunction with exercise was beneficial. The use manipulation combined with exercise, rather than each alone, had the most significant short-term and long-term benefits.

There was a negative impact on both societal and individual quality of life of those suffering from cervicogenic headache. Society was impacted negatively both economically and socially from chronic headache.

No studies were found identifying the biomechanics of spinal manipulation performed on those suffering specifically from cervicogenic

headache. No studies were found identifying the neurophysiological effect of spinal manipulation on those suffering from cervicogenic headache.

Conclusions

The reliability of interexaminer and intraexaminer mobility testing, for both physiological and accessory segmental testing, is still under debate. As long as one therapist was identifying the limited spinal segment, it was a reliable method to make a differential diagnosis of cervicogenic headache.

The efficacy of spinal manipulation for treating neck pain or chronic neck pain was statistically supported as a possible treatment option, especially when used in conjunction with exercises. Spinal Manipulation for neck pain alone was neither shown to be beneficial, nor non-beneficial. The efficacy of spinal manipulation on patients suffering from various types of headaches has been both supported and rejected by different studies. This is primarily due to the poor availability of good methodological studies and lack of more rigorous trials. Although some studies supported the efficacy of spinal manipulation on cervicogenic headaches, the diagnosis was not clearly defined using one of the recognized diagnostic classifications. The efficacy of spinal manipulation on cervicogenic headaches based on the HIS classification system demonstrated overall positive results, both as a singular treatment and in conjunction with exercise. One study was supportive of mobilization techniques for cervicogenic headache. Thus, both manipulation and mobilization appeared to have statistical support as efficacious therapies for decreasing headache frequency, duration, intensity, and analgesic consumption. There was only a single study addressing the efficacy of spinal manipulation on patients with cervicogenic headache as described by Sjaastad, et al. It statistically supported the efficaciousness of spinal manipulation (low-velocity mobilizations and high-velocity

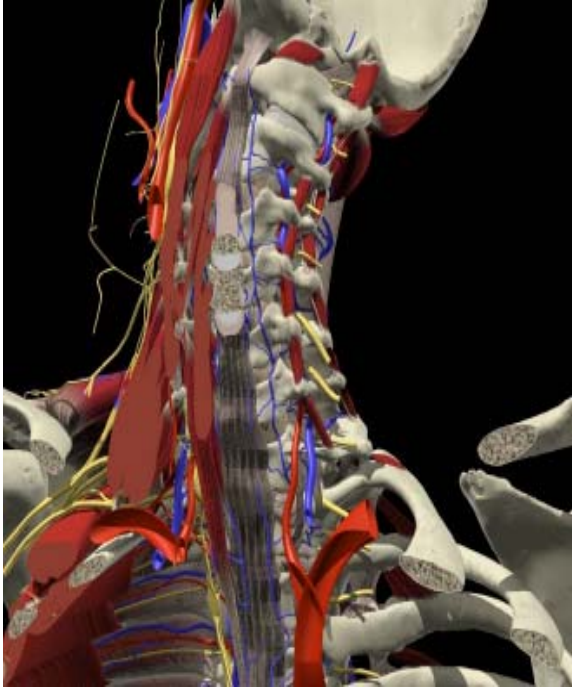
manipulation techniques), exercise (low load endurance exercises to reeducate muscle control of the cervicospinal region), and the combination of manipulation and exercise to reduced headache intensity, headache frequency, and neck pain/disability (Northwich Park Questionnaire), even after 1-year ($P < 0.05$). Medication intake was also decreased for all groups in this study. This study also showed if there were any concerns about the use of manipulative procedures to the upper cervical spine, than the implementation of this low load exercises program would be indicated. The most statistically significant benefit resulted from the combination of manipulation and exercise.

The quality of life of those affected by headache is important and significant. Those who suffer from chronic headache of daily headache are the most at risk. The detrimental impact on society included physical mobility disabilities, social isolationism, and an overall negative influence on a person's quality of life. Those with cervicogenic headache had statistically higher incidences of pain reports and limits in their daily physical activity ability. Those with cervicogenic headache demonstrated an overall impaired quality of life.

Pathophysiology is directed towards the trigeminocervical nucleus. Its pathway is irritated by the afferent sensory information it receives from various anatomical regions, thereby instigating the signs and symptoms of cervicogenic headache. These anatomical regions can be identified. The most likely causative regions are: the synovial and articular components of the facets and uncovertebral joints, the corresponding discs to these regions, myofascial trigger points, cervical and upper thoracic musculature, and the surrounding ligaments in the cervical and upper thoracic regions. It is also plausible afferent sensory information may extend down to the upper thoracic segments due to ascending and

descending afferent sensory nociception information among spinal segments. This may explain why manipulation may be effective when it is not segmentally specific.

According to the literature the presence of complications from spinal manipulation varies. Critics say part of this variability is due to a lack of reporting injury incidence from manipulation. Serious complications have been most notably associated with rotational techniques. Vertebral artery safety is the primary concern during upper cervical spine manipulations. The reliability, sensitivity, and specificity in detecting those at risk of cerebral vascular accident (CVA) as a direct result of upper spinal manipulative procedures of the vertebral artery pre-manipulative testing procedures has been debated. The literature has not identified one clinical screening test as best for ruling-in or ruling-out the possibility of vertebral artery problems to help identify those at risk from a manipulative procedure. It has been demonstrated that the deKleyn's position and the pre-manipulative hold (PMH) C1-C2 were adequate screening indicators of problems. Current literature has shown that the mechanical forces involved with spinal manipulation do not appear to strain the vertebral artery. Vertebral artery blood flow, even in the presence of occlusion, can be compensated. The speed of the manipulative procedure is fast enough that any deformation of the vertebral artery is unlikely. A vertebral artery occlusion occurring during the manipulative procedure is much more likely to have been caused by some co-morbidity. One author suggested that the incidence of cerebral vascular accident (CVA) attributed to spinal manipulation is equal to that of the spontaneous rate for cervical arterial dissections. Other factors to consider prior to upper cervical manipulation may include the presence of elevated levels of the amino acid homocysteine high blood pressure readings, and the presence of bruits upon auscultation.



Picture Ref:
www.primalpictures.com

Presently, there is no penultimate screening test or protocol to prevent all strokes from occurring. However, clinicians should perform manipulative therapy according to the best evidence-based approaches available. This includes a thorough history, general medical screening, performance of physical testing procedures (i.e. deKleyn's and PMH), and, where available, using blood panel results and Doppler velocimetry as valid vertebral

Cervical spinal manipulation has been demonstrated to increase the biomechanical range of motion of a joint/segment as well as decrease pain. There remains conflicting evidence as to which mode of manual therapy, either mobilization or manipulation, increases the range of motion most effectively. Debate also persists as to the lasting long-effect of cervical spine manipulation consistently involves 3 regions. These are the mechanoreceptors of the

joint, the spindles of the muscles, and regions associated with the pain processing theory.

This comprehensive literature review provided legitimacy and a clear definition for the diagnosis of cervicogenic headache. This study compiled the current evidence-based physical therapy knowledge base on the implementation and efficacy of spinal manipulation of the cervical spine, specifically for those suffering from cervicogenic headache. It is exposed the importance of rigorous training of spinal manipulation, especially to the upper cervical spine, in physical therapy education.

Risk Factors for Lumbar Disc Degeneration

By

Didrik Soplér, Ph.D., L.Ac.

In a 5 year period 41 asymptomatic individuals were evaluated for lumbar disc degeneration and further progression.¹

The investigators did a baseline MRI scan in the beginning and another one at the 5 year follow-up assessment.

Different variables were assessed at baseline and at follow-up. The emphasis was focused on physical job characteristics, sports activities and MRI based morphologic findings.

At the 5 year follow-up 17 (41%) of the participants showed deterioration of the disc status. However only a weak correlation was found between disc degeneration and the development of low back pain during the 5 year follow-up time.

The researchers concluded that the extent of disc herniation, the lack of sports activities and night shift work are significant risk factors for the development of lumbar disc degeneration.

Another risk factor for lumbar disc degeneration is overweight. This was recently studied by researchers in Finland.²

129 working middle-aged men representing three occupations machine drivers, construction carpenters and office workers were selected for a baseline MRI. The participants age was 40-45 years and they had a follow-up MRI 4 years later.

The weight and height at age 25 and 40-45 years were assessed and occupation, history of car driving, smoking and back injuries were calculated for.

The conclusion was that the study provided evidence that a BMI above 25 increases the risk of lumbar disc degeneration. Overweight at a young age was particularly detrimental.

Reference:

1. Elfering A. Semmer N. et. al. Risk factors for lumbar disc degeneration: a 5-year prospective MRI study in asymptomatic individuals. *Spine*. 2002 Jan 15;27(2):125-34.

2. Liuke M. Solovieva S. et. al. Disc degeneration of the lumbar spine in relation to overweight. *Int J Obes (Lond)*. 2005 Aug;29(8):903-8.

Abstract

The Relationship between Participation in a Manual Therapy Treatment Program and Changes in Cervical Range of Motion And Dizziness, in Patients with Suspected Sericogenic Dizziness

By
Frank L. Gargano, DPT

Purpose

The purpose of the present study was to determine the extent to which changes occurred in selected variables associated with cervical range of motion and dizziness in subjects who were suspected to have cervicogenic dizziness and who participated in a Manual Therapy treatment program.

Selected variables included left and right upper cervical, cervical flexion and extension, left and right lateral flexion, and gross cervical left and right range of motion measurement; plus functional, physical, emotional, and total dizziness, as measured by the Dizziness Handicap Inventory.

Methodology

The research design was a single group experimental design with repeated measures. Range of motion and dizziness measurements were obtained both prior to and following participation in the Manual Therapy treatment program.

Five males and seven females were selected for the study based on their clinical diagnosis of cervicogenic dizziness and on their compatibility with the other inclusion and exclusion criteria.

The Wilcoxon signed ranks test was used to determine whether observed differences between pre and post treatment measures on the selected variables were statistically significant.

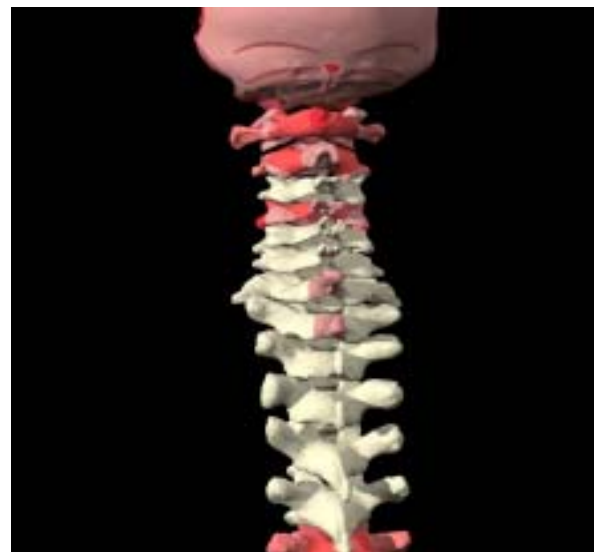
Findings

Results of the tests of significance for each of the hypotheses indicated that the observed changes exceeded the 0.05 level of confidence, therefore all 12 of the null hypotheses were rejected.

Thus, this study found that the subjects who participated in the Manual Therapy treatment program improved to a statistically significant extent on the selected variables of functional, physical, emotional, and overall dizziness, and for left and right upper cervical, flexion and

Conclusions

Although no studies were found in the current literature that were identical to the current study, a few studies were found that addressed the purpose of this study in some way. Findings of the current study agree with these previous studies but additional research needs to be conducted in order to develop a more complete picture of the relationship between range of motion and dizziness and participation in Manual Therapy treatment programs. Such studies could include replicating the current study: using a control group; using the VAS and compare scores with the DHI; and adding the inclusion criterion of a positive vestibular test.



Picture Ref:
www.primalpictures.com

Abstract

The Role of the Lumbar Multifidus in Manual Therapy In Patients with Chronic Low Back Pain And Lumbar Segmental Instability

By
Alec G. Kay, DPT

Purpose

The purpose of this study was to induce and organizational structure from the large and rapidly growing body of literature on the role of the lumbar multifidus in Manual Therapy fro chronic low back pain and lumbar segmental stability.

Methodology

The research design employed in this study was an Extensive Literature Review, in which the researcher conducted an exhaustive search for all the literature pertaining to the purpose of the study.

Sources and kinds of data included articles identified through a search of the MEDLINE database, plus articles appearing in the bibliographies of these MEDLINE articles, proceedings from professional meetings, and journals and books identified through the database but that were not included in the database themselves.

Analysis of the data involved three steps: First, once copies of the articles were obtained, they were divided into three groups: opinion articles, literature reviews, and experimental studies, with the experimental studies being further divided into descriptive and control. Second, within each of these three methodological groupings, the literature was organized into the smallest number of primary, secondary, and tertiary categories that encompassed all of the articles within the groups. Third, synopses were written fro each of the articles in each of the three groups.



Picture Ref:
www.primalpictures.com

Findings

The organizational structure induced from the analysis of the data consists of five primary categories: Anatomy, Biomechanics, Proprioception/Neural Coordination, Role in Chronic Low Back Pain, and Role in Segmental Stability.

Secondary and tertiary categories within the Anatomy category included Gross Anatomy, with tertiary categories of Normal and Pathological; and Histological, with tertiary categories of Muscle Spindles and Mechanoreceptors, Metabolism and Fiber Types, and Pathological.

Secondary categories in both the Biomechanics and Proprioception/Neural Coordination categories included Normal Findings and Pathological Findings.

Secondary categories in the Role in Chronic Low Back Pain category included Exercise, Muscle Activity and Electromyographic Studies, Strength and Endurance Studies, and Case Studies; while secondary categories in the Role in Segmental Instability category included Measuring and Describing Segmental Instability and Factors Contributing to Segmental Instability.

Conclusions

The organizational structure induced through this extensive literature review can help clinicians more easily digest the vast amount of information available to them on the role of the lumbar multifidus in Manual Therapy so they can better treat patients with chronic low back pain and lumbar segmental instability. Further, with the existing literature now organized into an efficient framework, future research on this topic can be designed to improve the quantity and quality of information available. Finally, the structure can also serve as a framework to facilitate the allocation of literature that becomes available in the future.

Advertise here with SPT

- Do you own new or gently-used equipment you would like to sell?
- Do you provide a service physical therapists and orthopedic professionals need?
- Would you like to advertise to professionals like yourself?

If you answered yes to any of these questions, call us! We have reasonable prices and advertising for 1/4 page, 1/2 page and full page.

Scientific Physical Therapy
4420 Hotel Circle Court Suite 210
San Diego, CA 92108-3423
Phone: [800] 883-1252
E-mail: scientificpt@sbcglobal.net

Looking for direction?

The Ola Grimsby Institute can show you the way!

- Earn your DPT in one year.
- Boost your skill level through our ongoing continuing education courses.
- Advance your career in manual physical therapy.
- Attend the best physical therapy postgraduate school with the lowest per credit tuition fees.

Find it at the Ola Grimsby Institute

"I graduated from part I (the DPT program) in 1995," writes an OGI graduate. "Partly due to my OGI education, I now own my own practice, which is doing very well. Thank you!"

The Ola Grimsby Institute
4420 Hotel Circle Court . Ste 210 . San Diego, CA 92108

Choose from part time residency & independent study programs.
Visit our web site to learn about tuition discounts: OlaGrimsby.com/Ad.
Call us toll free: 800.646.6128. Reserve your space today!

To sign up for classes, please download our [Registration Form](#) (requires [Adobe Acrobat Reader](#)). To apply for our degree or certificate programs, please download our [Application Form](#). Please fax your completed registration form to (619) 298-4225 or mail it to The Ola Grimsby Institute, 4420 Hotel Circle Court, Ste. 210, San Diego, CA 92108.

Please visit our [Continuing Education](#) section for course descriptions; visit our [Degrees](#) section for more information about our degree programs. Thank you for your interest in Ola Grimsby Institute. We look forward to helping you further your career in manual physical therapy!



The Academy of Doctoral Sciences, Inc is a Utah-based corporation offering a doctor of manual therapy degree for physical therapists who have completed their manual therapy residency and fellowship programs and who have received their DPT from the Ola Grimsby Institute.

The third year of postsecondary education following the OGI programs is a year of advanced clinical specialization for which the academy is granted the right to issue a doctor of manual therapy degree.

For further information contact:
The Ola Grimsby Institute
4420 Hotel Circle Court, Suite 210
San Diego, CA 92108
Phone: 1-800-646-6128.

**If you, by making a simple recommendation,
could improve treatment outcome,
would you be interested?**

The website www.tissuerecovery.com was set up to make it easy for your patients to get access to nutritional information and supplements supporting the treatment you do.

E-books with just the important facts, quick and easy to read, can be downloaded immediately. We can also print and mail these books to people who prefer that.

The e-books based on the latest research and sound physiology, are:

Facts You Need to Know About Carbohydrates, but No One Told You

Facts You Need to Know About Fat, but No One Told You

Facts You Need to Know About Protein, but No One Told You

We also have an **anti-inflammatory formula**, giving quick and effective pain relief, without the side effects of anti-inflammatory drugs.

As a physical therapist we have a special offer for you. Give us a call at 1-800-883-1252 or 1-619-299-8346 and we will explain it to you. You will not find this offer on the website.

Your patients are of course also welcome to call us if they are more comfortable with the phone than the computer.

The easiest way to incorporate nutrition is for patients to start taking the BMJ Formula. The BMJ supplies specific nutrients in an easy absorbable form targeted to support bone and joint cartilage as well as other connective tissue.



Log on to www.tissuerecovery.com and read what some of the latest research reveals about inflammation. Check out our website and call us at 1-800-883-1252 or 619-299-8346

Improve your treatment outcome

- ✓ Do any of your patients complain of stiffness in the morning?
- ✓ Do you have patients with degenerative joint disease?
- ✓ Would your patients like to prevent joint degeneration?
- ✓ Do you have patients who complain of muscle cramps?
- ✓ Do you have patients with decreased bone density?
- ✓ Do you treat patients who are recovering from a fracture?
- ✓ Would your patients like to prevent osteoporosis?
- ✓ Would you like to support collagen formation in your patients?

If you answered yes to any of these questions, introduce your patients to the BMJ formula. Both you and your patients will be glad you did.

The BMJ is a unique formula based on scientific studies providing important support for the tissue you treat:

bone, cartilage, disk, ligaments and tendons, as well as, neuromuscular function.

The BMJ contains calcium, magnesium, zinc, copper and manganese, vitamin D, vitamin B₆ and glucosamine sulfate.

The minerals are supplied as patented amino acid chelates for greater absorption.

We will provide you brochures with a list of scientific references. **BMJ, the ultimate tissue support for orthopedic patients.** Small effort, big benefits, supporting your treatments.



You can order for your patients [or for yourself] or have your patients order directly by calling 800-883-1252.

Visit our web site at www.tissuerecovery.com.

Scientific Physical Therapy

a peer-reviewed publication on the internet

Editorial Board

- Ola Grimsby, PT, MNFF, MNSMT, FAAOMPT
- Scott Olsen, PT, MOMT, FAAOMPT
- Bill Hinson, PT, MOMT, FAAOMPT
- Rick Hobusch, PT, MOMT, MNSMT
- Brad Jordan, PT, MOMT, MNSMT
- Brian Power, PT, MOMT, FAAOMPT
- Jim Rivard, PT, MOMT, OCS, FAAOMPT

Editor

Didrik Sople, PhD, LAc

- Scientific Physical Therapy is a peer reviewed journal published on the internet four times yearly
- Please visit our web site: www.scientificphysicaltherapy.com

For a free subscription, contact us at scientificpt@sbcglobal.net
Scientific Physical Therapy
4420 Hotel Circle Court Suite 210
San Diego, CA 92108-3423 USA

Material to be considered for publication can be submitted as articles, case studies, research reviews or clinical pearls related to the practice of manual therapy. The material can be e-mailed to scientificpt@sbcglobal.net or mailed on a PC formatted disk or cd to Scientific Physical Therapy 4420 Hotel Circle Court Suite 210 San Diego, CA 92108-3423 USA