TANG HUMANITAS MEDICINE

Brief Communication

Complementary and alternative medicine for neck pain: Focus on manipulative therapies-chiropractic and osteopathic techniques

Christopher Thomas Plastaras[1], Seth Schran[2,*], Joseph Constantino[3]

[1]Department of Physical Medicine and Rehabilitation, University of Pennsylvania, Penn Spine Center,Penn Medicine Rittenhouse1800 Lombard Street, 1st FloorPhiladelphia, PA 19146; [2]Center for Joint and Spine Relief311 Newark AveJersey City, NJ 07302; [3]Rowan School of Osteopathic Medicine42 E. Laurel Rd.Stratford, NJ 08084, USA

ABSTRACT

Neck pain is an extremely common symptom with a variety of potential etiologies. A significant number of patients are turning to complementary and alternative medicine therapies. In particular, chiropractic and osteopathic manipulation techniques are discussed. "Low quality evidence", as per the GRADE system criteria used by the Cochrane Review, supports the beneficial effects of these treatments Complications are generally benign and self-limited although occasional catastrophic consequences have been documented. Medical practitioners should familiarize themselves and their patients with the risks and benefits of complementary and alternative medicine in order to make informed decisions.

Keywords neck pain, chiropractic, osteopathic, manipulation, complementary and alternative medicine

INTRODUCTION

Neck pain is a common and potentially difficult to treat problem. At any point in time, about 15% of adults are experiencing neck pain (Hellmann and Stone, 2007). In 2006, neck pain accounted for 13.2 million patient visits in The United States, or more than 1% of all healthcare visits to hospitals and physicians offices. Four out of five of these visits were comprised of patients between the ages of 18 and 64 with a slight preponderance of females at 58% (United States Bone and Joint Initiative, 2011).

Various studies have described the patients who are using complementary and alternative medicine (CAM) to alleviate pain. One cross-sectional study showed that about 23% were hoping to avoid invasive procedures, 34% were disappointed by conventional medicine, and about 50% were using CAM together with conventional treatments (Peleg et al., 2011). A cross-sectional study in Singapore concluded the prevalence of CAM use in those with chronic pain is higher than in a general population. Reasons for CAM use included fewer side effects and lower costs (Tan et al., 2013).

An analysis of the 2002 - 2008 Medical Expenditure Panel Survey showed that CAM-utilizing patients did not add to the overall medical spending in a nationally representative sample with neck and back conditions. In fact, their adjusted annual medical costs were $424 lower for spine-related conditions and $796 lower for total health care expenditures compared to non-CAM users. These differences were primarily due to lower inpatient expenditures (Martin et al., 2012).

Conventional medicine offers a variety of treatment options including pharmacotherapy, physical therapy, injections, and surgical procedures. Most demonstrate modest efficacy at best or have associated risks. Patients turning to CAM for neck pain have a seemingly overwhelming number of options to choose from. This article focuses on some of the manipulative therapies that are available and discusses the current evidence-base so that patients and providers can make informed decisions.

Chiropractic

The use of provider-based CAM therapies, such as chiropractic, has been increasing (Su and Li, 2011). The 2008 prevalence for chiropractic use was estimated at 5% (Zodet and Stevans, 2012). Chiropractic care includes, although is not limited to spinal manipulative therapy (SMT). Chiropractic care also includes rehabilitative exercises, ice, heat, ultrasound, and lifestyle modifications among other modalities. For purposes of this review, the role of SMT for neck pain will be discussed.

Various types of SMT have been described, including unloaded spinal motion, manual repetitive oscillations, and high velocity low amplitude (HVLA) manipulation. SMT seeks to restore proper joint mechanics in order to decrease pain and stress on the surrounding tissues. Unloaded spinal motion involves continuous passive motion delivered by motorized tables and application of flexion-distraction techniques. HVLA involves delivering a high velocity low amplitude thrust within a joint's range of motion to correct subluxations. There is no current triage system to select a technique, although individual practitioners consider factors such as the patient's age, diagnosis, and body habitus (Triano, 2001).

Effects of SMT have been documented. EMG of the deltoid muscle (supplied by C5 and C6 nerve roots) showed small increases in amplitude and fatigue resistance following C5/C6-targeted manipulations (de Camargo et al., 2011). In an NIH study, 12 weeks of SMT significantly reduced participant-reported pain compared to medication at follow-up intervals between 8 and 52 weeks. Comparing SMT to home exercise program with advice showed no significant differences. One

*Correspondence: Seth Schran
E-mail: hshs78@gmail.com
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caveat to this study's conclusions is that participants and providers were not blinded (Bronfort et al., 2012). For those who are uncomfortable with neck manipulations, thoracic spine manipulation may provide short-term improvement for those with mechanical neck pain (Cross et al., 2011). A 2010 Cochrane review concluded that there is "low quality evidence" that either cervical manipulation or thoracic manipulation can reduce neck pain. This study used the GRADE approach of rating quality of evidence where "low quality evidence" is defined by "further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate". This GRADE system classifies level of evidence as "high quality evidence", "moderate quality evidence", "low quality evidence", "very low quality evidence", or "no evidence" (Gross et al., 2010).

Adverse effects of SMT are also generally benign and self-limited. The most common are local discomfort, headache, tiredness, or radiating discomfort, which usually resolve within 24 h (Senstad et al., 1997). The more ominous risk of vertebrobasilar artery (VBA) stroke is often cited by opponents of SMT. The incidence has been estimated between 1 in 200,000 (Michaeli, 1993) to 1 in a million (Haldeman et al., 2002). The frequency of VBA stroke associated with chiropractor visits, however, may not be any different than for primary care doctor visits (Cassidy et al., 2008). These rare events pale in comparison to non-CAM therapies commonly recommended for musculoskeletal conditions including non-steroidal anti-inflammatory drugs (NSAIDs). For example, the risks of manual treatments for neck pain have been noted to be safer than those associated with oral non-steroidal anti-inflammatory medications (Dabbs and Lauretti, 1995). Clinically significant upper gastrointestinal episodes occur in 1 - 2% of patients who take NSAIDs; annual deaths in the United States have been estimated between 3,200 to 16,500 (Cryer, 2005).

Osteopathic

Osteopathic manipulative treatment (OMT) is another CAM modality used in the treatment of neck pain. Andrew Taylor Still founded the first school of osteopathy in Kirskville, Missouri (1892) (Trowbridge, 2007). He had worked as a hospital steward in America's Civil War, suffered the death of his own children from spinal meningitis, and eventually became disillusioned with the poor outcomes of conventional medical and surgical treatments of his time. Osteopathy is based on the core principal that the body is capable of maintaining and healing itself. Osteopathic physicians or osteopaths use a variety of techniques, such as HVLA thrust, soft tissue manipulation, and muscle energy techniques to overcome biomechanical barriers to self-healing. While osteopathy is considered a distinct discipline, there is some overlap with chiropractic, such as both employing HVLA techniques. A 2005 meta-analysis and systematic review of OMT for low back pain concluded that OMT significantly reduced low back pain (Licciardone et al., 2005). Significantly fewer studies have examined OMT for neck pain.

McReynolds and Sheridan's randomized trial on the treatment of acute neck pain in the emergency department compared OMT to intramuscular injection of 30 mg of ketorolac. Both treatment groups showed a significant reduction in pain intensity, and OMT showed significantly greater reduction in pain intensity compared to the injection. The main limitations of the study were the lack of blinding and placebo. The authors maintained that a proper sham or placebo manipulation does not exist. A placebo would have to cause no biomechanical effects while at the same time appearing valid to patients (McReynolds and Sheridan, 2005).

Martinez-Segura et Al showed that a single cervical HVLA manipulation significantly reduced neck pain and improved active range of motion compared to a control mobilization technique 5 min post-treatment. Patient inclusion criteria included a lateral gliding test to establish the presence of an intervertebral joint dysfunction at C3 - C4 or C4 - C5 levels (Martinez-Segura et al., 2006). A case series study demonstrated a significant reduction in mechanical neck pain, although no significant changes in cervical range of motion, both immediately and at 48 h following a single *thoracic* HVLA manipulation (Fernandez-del-la-Penas et al., 2007).

While the literature on OMT for neck pain is sparse, a handful of studies suggest rapid pain reduction and range of motion improvements. If manipulative therapies are to gain scientific validity above and beyond the powerful placebo effect of the laying of hands, more high quality research is needed. In particular, the development of sham manipulation or control protocols is a unique challenge inherent in manipulative medicine research. Sham manipulations have been employed in low back research and the development of validated sham cervical manipulation protocols is needed. For example, Brose et al. (2013) have begun developing sham protocol for cervical strain-counterstrain research. Licciardone and Russo (2006) have elucidated the difficulty blinding research trials even when sham manipulations are used as placebo controls. When comparing written descriptions of sham treatments versus OMT, research subjects consistently determined OMT to be the more valid treatment.

Risks involved with OMT remain very low. OMT appears to be safe in children when performed by qualified practitioners. No treatment-related complications were noted in a retrospective review of the medical records of over five hundred children (Hayes and Bezilla, 2006). In the McReynolds and Sheridan trial, one OMT patient noticed the arm felt "funny" after the treatment intervention. The patient had no abnormal neurological signs on physical examination. In the ketorolac group, 8 patients had a variety of adverse reactions, including arm soreness as one of these reactions. The authors commented that the true incidence of complications when using OMT on the neck is unknown, although is probably similar to that described in the chiropractic literature (McReynolds and Sheridan, 2005).

The effects of manual therapies on skeletal muscle can also be understood at the molecular level. Skeletal muscle, through the process of mechanotransduction, translates mechanical forces into biochemical signals, which influence protein expression. For example, muscle responds to overload by adding sarcomeres in parallel (mucle hypertrophy). Similarly, following skeletal muscle strain or injury, inflammatory cytokines are released. Pro-inflammatory cytokine levels of TNF-alpha and interleukin-6 were decreased in muscle biopsies taken from human subjects receiving massage to exercised quadriceps muscle (Crane et al., 2012). These cytokines are thought to play a role in the development of acute and chronic pain states. Cytokine expression also determines differentiation of immune cells, or macrophages, into their M1, or pro-inflammatory phenotype (Lawrence and Natoli, 2011). Manual therapies, such as massage, are accompanied by a decrease in the amount of M1 macrophages and an increase in M2, or anti-inflammatory type macrophages that encourage tissue repair (Banker, 2013). Further research could also compare and contrast the biochemical effects of various types of manual therapies.

Other techniques

Having originated in America, chiropractic and osteopathic manipulative techniques are well-known and widely practiced in the authors' country. As CAM continues to globalize, patients and physicians are confronted with having to evaluate techniques from around the world. English-language publications on cervical manipulation techniques from non-English-speaking countries are scarce, although some studies do exist. For example, a recent study by Lin et. Al examined the effects of Long's manipulation, a traditional Chinese medicine manipulation technique. This technique is not to be confused with other forms of traditional Chinese medicine, such as herbal remedies and acupuncture, which are beyond the scope of this article. Patient's undergoing eight 20 min sessions of Long's manipulation showed significantly improved neck pain intensity, reduced neck disability, and improved patient satisfaction compared to traditional Chinese massage techniques both immediately and at short-term follow-up. The manipulation used in this study involved neck flexion until tension was palpated. Then, neck rotation was performed to the patient's range of motion endpoint (Lin et al., 2013). Low quality evidence (as per the GRADE system) suggests that compared to seated cervical traction, Chinese manipulation produced more immediate post-intervention pain relief (Lin et al., 2012).

CONCLUSION

Utilization of provider-based CAM therapies has been on the rise. "Low quality evidence" (as per the GRADE system used by Cochrane Review) has demonstrated the beneficial effects of manipulative therapies for neck pain. While there are likely more numerous techniques utilized by therapists around the world than are described in the literature, the lack of a valid placebo manipulation seems independent of the specific type of manipulation being studied. Despite difficulties inherent in manipulative therapy research protocols, clinicians can be reassured that the risks involved in manipulation therapies are generally lower in incidence than for conventional allopathic medical treatments for neck pain. Such risks have occurred, though, and patients and clinicians should make informed risk-benefit decisions on a case-by-case basis.

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CONFLICT OF INTEREST

The authors have no conflicting financial interests.

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