

Position on Thrust Joint Manipulation Provided by Physical Therapists

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An American Physical Therapy Association White Paper

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Introduction

The *Guide to Physical Therapist Practice*¹ provides the framework for describing physical therapist practice, the patient/client management model, tests and measures, and interventions routinely used by physical therapists (PTs). Included among the described interventions are manual therapy techniques, which encompass **mobilization/manipulation**, defined as “comprising a continuum of skilled passive movements to the joints and/or related soft tissues that are applied at varying speeds and amplitudes, including a small-amplitude and high-velocity therapeutic movement.”¹ Central to this white paper is thrust joint manipulation (TJM); unique compared with other manual therapy techniques due to its small-amplitude/high velocity nature.² Within the physical therapy profession, TJM techniques are performed only by physical therapists, and are not to be delegated to physical therapist assistants (PTAs) or physical therapy aides.³ Historically, TJM has been associated with physical therapist practice since the 1920s,⁴ and PTs have long been involved in manipulation-related research as providers of care and as principle researchers.^{5,6} Despite this long history, and unlike most other physical therapy interventions, TJM for decades has been at the center of legislative challenges that the physical therapy profession faces.⁷

Chiropractic organizations began opposing physical therapists performing TJM in the late 1960s, and continue today. The APTA Orthopaedic Section was founded in 1974 to advance physical therapist practice in the area of orthopedics.⁸ Twenty years later the American Academy of Orthopaedic Manual Physical Therapists (AAOMPT) was founded to advance physical therapist practice in the area of orthopedic manual physical therapy and to further mobilize legislative and regulatory resources. The rise in number of challenges and the ferocity of attacks peaked in the late 1990s, when PTs were being recognized as chiropractors’ chief competitors in the provision of conservative care for patients with musculoskeletal conditions. More recently, chiropractors have noted that the physical therapist education programs’ shift to the entry-level doctor of physical therapy (DPT) degree, and legislative passage of patient direct access to physical therapy services, are elevating PTs to being their primary economic threat, now and into the future.⁹ “The Future of Chiropractic Revisited: 2005-2015”⁹ contains statements such as, “The biggest competitive threat will come from physical therapists. Physical therapists will expand their direct patient access and restructure their educational programs so most are Doctor of Physical Therapy programs.”

While the number of states facing chiropractic legislative challenges has dropped since the highs of 23 noted in 1998 and 18 in 2000, the ferocity of the attacks has not. Such opposition also has extended into regulatory and reimbursement domains; chiropractors have initiated action at the Department of Health and Human Services and the Veterans Health Administration to prohibit PTs from using TJM. They also strongly opposed allowing use of the manual therapy CPT code for reimbursement to physical therapists. Despite the evidence noting economics as the primary issue behind these challenges, opponents' arguments are always centered on the claims of TJM falling outside the scope of PT practice, lack of PT training, and compromised patient safety.

TJM and Physical Therapist Practice: Historical and Current Overview

The history of manipulation in recorded history can be traced back to the days of Hippocrates, the father of medicine (460-355 B.C.). There is evidence in ancient writings that Hippocrates used spinal traction methods, and in the paper "On Setting Joints by Leverage," Hippocrates describes the techniques used to manipulate a dislocated shoulder of a wrestler.⁴ Five hundred years later, Galen wrote extensively on manipulation procedures in medicine.⁴ The bone setters were layman who practiced manipulation in Europe in the 1600s through the late 1800s. Friar Moulton published the text in 1656 called "The Complete Bone-Setter," and the book was later revised by Robert Turner.¹⁰ In 1871, Wharton Hood published the book "On Bone-Setting" which was the first such book by an orthodox medical practitioner.¹¹

In the United States, manipulation was first formally integrated into clinical practice by the osteopaths. Osteopathy was founded by Andrew Still in 1874, and in 1896, the first school of osteopathy was formed in Kirksville, Missouri.⁴ Osteopathy philosophy was based on the "Rule of the Artery" with the premise that the body has an innate ability to heal, and with spinal manipulation to correct the structural alignment of the spine, the blood can flow to various regions of the body to restore the body's homeostasis and natural healing abilities. The Osteopathic profession continues to include manipulation in its course curricula but no longer adheres to Still's original Rule of the Artery philosophy.

Chiropractic was founded in 1895 by Daniel David Palmer, with the original chiropractic philosophy based on the "The Law of the Nerve" that states that adjustment of a subluxed vertebra removes impingement on the nerve and restores "nerve flow," thus promoting healing of disease processes.⁹ The "straight" chiropractors continue to adhere to Palmer's original subluxation theories and use spinal adjustments as their primary means of treatment. The "mixers" incorporate other rehabilitative interventions into their treatment options including physical modalities such as ultrasound and exercise.

Physical therapy evolved from traditional medicine to provide physical interventions including manual physical therapy. The first professional physical therapy association in the United States, which was the forerunner to the American Physical Therapy Association (APTA) was formed in 1921.¹² Between 1921 and 1936, there were at least 21 articles and book reviews on manipulation in the physical therapy literature.¹³ The first APTA President, Mary McMillan, wrote in the second edition of the book *Massage and Therapeutic Exercise* and in a subsequent editorial¹⁴ of the four branches of “physiotherapy,” which she identified as “manipulation of muscle and joints, therapeutic exercise, electrotherapy, and hydrotherapy.”¹⁵ This illustrates that manipulation has been part of physical therapist practice since the founding of the profession.¹³

In the 1960s, several physical therapists emerged as international leaders in the practice and instruction of manipulation. Physical therapist Freddy Kaltenborn, originally from Norway, developed what is now known as the Nordic approach. He published his first textbook on spinal manipulation in 1964.¹⁶ and developed extensive training programs for physical therapists to specialize in manual therapy first in Norway and then later throughout Europe and the United States. Australian physical therapist Geoffrey Maitland published the first edition of his book “Vertebral Manipulation” in 1964.¹⁷ Many US physical therapists traveled to Australia and Norway in the 1970s and 1980s to participate in long-term courses and residencies in manual physical therapy. Residency programs were then set up by these physical therapists in the United States to promote the teachings of Maitland and Kaltenborn. Although professional physical therapist training includes instruction in manipulation, residency and fellowship post-professional training programs continue to be the preferred mode of instruction to gain advanced competency in manipulation and manual physical therapy.

Physical therapist Stanley Paris, originally from New Zealand, was awarded a scholarship early in his career to study manipulation in Europe and the United States in 1961 and 1962.¹³ He later developed numerous professional and post-professional educational programs in the United States in manual therapy and manipulation including the formation of the University of St Augustine for Health Sciences in St Augustine, Florida.

Documentation of manipulation being part of physical therapy practice dates back to the beginning of the profession, and with the influence of internationally recognized leaders in manual physical therapy plus new research findings, the practice of TJM and associated education continues to evolve.

TJM and Physical Therapist Training

Physical therapist TJM training starts in physical therapist professional education (entry-level)

programs. Entry-level program curricula design and implementation are primarily directed by A *Normative Model of Physical Therapist Professional Education: Version 2004 (Normative Model)*¹⁸ and the Evaluative Criteria For Accreditation of Educational Programs for the Preparation of Physical Therapists (Evaluative Criteria)¹⁹ used by the Commission on Accreditation in Physical Therapy Education (CAPTE). The *Normative Model* encompasses the primary content to be taught to physical therapist students and include manual therapy techniques “including mobilization/manipulation: spinal and peripheral joints, thrust and non-thrust” among the interventions to be taught.¹⁹ CAPTE is the *sole* organization in the United States to accredit physical therapist education programs, passing judgment on the quality and scope of PT training. The latest CAPTE Evaluative Criteria, effective January 1, 2006, includes a statement similar to that found in the Normative Model: “Provide physical therapy interventions to achieve patient/client goals and outcomes. Interventions include manual therapy techniques (including mobilization/manipulation thrust and nonthrust techniques).”²⁰ Consistent with these documents, the APTA Board of Directors adopted a position--Minimum Required Skills of Physical Therapist Graduates at Entry-level, which lists skills that include mobilization/manipulation thrust and non-thrust techniques.²⁰

A group of content experts convened by the American Physical Therapy Association created the APTA Manipulation Education Manual (MEM) to promote evidence-based practice in physical therapist entry-level academic curricula.² The document was written with both the academic and clinical education communities in mind and includes recommendations for curricular content, instructional and evaluative materials, and instructional resource lists. Built upon the MEM’s framework, AAOMPT sponsors TJM courses for academic and clinical education faculty annually.

Studies have described various ways TJM content has been integrated into physical therapist entry-level curricula; most often it is included in required clinical science courses (eg, musculoskeletal track).²¹ This represents a shift from earlier years when the content was taught more as a standalone required or elective course,²² a shift consistent with the efficacy evidence supporting a multifaceted treatment approach that includes manual therapy for musculoskeletal disorders.²³ Further evidence of TJM being incorporated successfully into entry-level education was provided by Flynn, Wainner, and Fritz. The authors described physical therapist student use of TJM on clinical internships including the report by students and their clinical instructors of no adverse patient events and successful treatment outcomes for patients with low back pain.²⁴

Besides the provided early educational training, numerous TJM professional development opportunities exist for PTs beyond their entry-level experiences. Research reports describe the various experiences by which graduates of physical therapist programs advance their TJM skills, including

clinical residency/fellowship training, post-professional academic programs, manual therapy certification programs, continuing education seminars, and clinical mentorships.²² Various clinical residency and fellowship programs are credentialed by APTA, and many of the manual therapy certification programs are housed in educational institutions. These experiences are consistent with other medical professions as ways to advance knowledge and clinical skills.

In summary, chiropractic claims that PTs do not receive training in TJM is unfounded. At the core of physical therapist education and practice are movement sciences and analysis. This expertise is grounded in anatomy, physiology, biomechanics, clinical medicine, and pathology, and it provides the knowledge base for understanding the indications and contraindications associated with TJM techniques. This foundation also lays the groundwork for a comprehensive patient examination scheme that will identify patients for whom TJM is appropriate. Physical therapist students also have hundreds of hands-on psychomotor training hours imbedded in all of the clinical science courses. This, along with the supervised clinical education experiences, well prepares the new graduate to competently and safely utilize TJM.

TJM and Patient Safety

Chiropractors claim that manipulation provided by PTs place the public at risk for serious injury. The following provides an overview of documented TJM patient risk from a general perspective, as well as a more specific focus on the use of TJM by physical therapists. Cervical spine manipulation techniques pose a risk of adverse effects that range from mild soreness to severe neurovascular injury. Adverse reactions to cervical spine manipulation may include a temporary increase in neck pain, radiating arm pain, headache, dizziness, impaired vision, or ringing in the ears.²⁵ Although minor temporary adverse reactions to cervical spine manipulation are fairly common, catastrophic complications from cervical manipulation are extremely rare. The most catastrophic complication is vertebral artery dissection, also known as vertebral basilar insufficiency (VBI), which is a condition characterized by occlusion or injury to the vertebral artery causing loss of blood flow to the hindbrain. The vertebrobasilar system provides 10%-20% of the brain's blood supply, branching to many vital neural structures, including the brain stem, cerebellum, spinal cord, cranial nerves III-XII and their nuclei, as well as portions of the cerebral cortex.²⁶ VBI may cause dizziness, lightheadedness, nausea, or numbness to the face, and could also result in slurred speech, nystagmus, double vision, swallowing problems, or blurred vision. More severe cases of VBI can present as a cerebrovascular accident (stroke) and even on occasion cause death.²⁷

DiFabio²⁸ completed an extensive literature review and found reports of 177 patients (from 1925-1997) who experienced adverse events to cervical TJM. The primary diagnosis was arterial dissection/spasm and brain stem lesions, and 32 cases (18%) resulted in death. The majority of the

injuries and deaths occurred at the hands of a chiropractor, while PTs were involved in fewer than 2% of the injury cases, and no deaths have been attributed to PTs providing cervical spine manipulation.²⁸ The exact serious complication risk from cervical spine TJM is unknown. Rivett and Milburn²⁹ estimated an incidence of severe neurovascular compromise within a range of 1 in 50,000 manipulations to 1 in 5 million manipulations. Other estimates of VBI risk from cervical spine TJM have been stated as being 6 in 10 million manipulations, or 0.00006%,^{30,31} and the risk of death at 3 in 10 million manipulations.³³

Serious or severe complications of lumbar spinal TJM are extremely rare.³² The most serious potential complication from lumbar TJM is development of cauda equina syndrome. Cauda equina syndrome is a medical emergency that should be surgically treated as soon as possible to relieve pressure on the nerves. Cauda equina syndrome may present with urinary retention, fecal incontinence, and widespread neurological signs and symptoms in the lower extremities that may include gait abnormality, saddle area numbness, or a lax anal sphincter. Haldeman^{33,34} reviewed the literature over a 77-year period and found only 10 reports of cauda equina syndrome following lumbar TJM none of which were from physical therapists performing the treatment. The risk of cauda equina syndrome from lumbar TJM has been estimated to be less than 1 in 100 million manipulations.^{35,36} The research suggests that severe adverse responses to TJM of the cervical and lumbar spine are extremely rare. Physical therapists provide the thorough, ongoing, patient assessment necessary to identify signs of VBI and cauda equina syndrome throughout the examination and treatment sessions, and are aware that TJM techniques must not be used when positive signs of these conditions are present. In such cases the PT will refer the patient to a medical doctor.

PTs have an extremely good medical–legal track record of patient safety and the use of TJM. According to a letter from Michael A. Scott, assistant vice president of Medical Professional Liability Underwriting at CNA dated February 15, 2008, HPSO, the primary liability insurance carrier for physical therapists in the United States, has confirmed that there are no higher claims losses for PTs who utilize TJM than for those who use other types of physical therapy interventions.³⁷ This finding is a result of sound clinical decision-making principles and practicing within the medical model of screening for red flags, adhering to appropriate indications and contraindications, and referring to other medical practitioners those patients who present with conditions outside the physical therapist scope of practice.

Research Supporting the Use of Manipulation

There is a large, growing body of research evidence to support and guide the use of TJM for all practitioners. Physical therapists are leading the effort to establish the evidenced-based framework for safe and appropriate use of TJM in treating movement disorders. PTs also are developing and validating

clinical predication rules for determination of patient signs and symptoms that will predict dramatic clinical improvement from TJM. (^{37, 38, 39}) This line of research has assisted in enhancing patient outcomes and safety in using TJM.

The highest level of evidence to support interventions is based on the recommendations of clinical practice guidelines, systematic reviews, and meta-analysis.⁴⁰ Numerous clinical practice guidelines have recommended manipulation for the treatment of spinal disorders^{41,42,43,44} with the strongest evidence supporting the use of TJM for patients with acute low back pain without radiculopathy. The recommendations include utilizing TJM within the first 4-6 weeks of pain onset.^{41,42,43,44} The first guideline to recommend TJM for acute low back pain was that of the United States Agency for Health Care Policy and Research⁴⁴ which ranked the evidence for manipulation higher than the evidence for any other treatment included in the review. In 2000, Johnson and Rogers published an analysis describing the practitioners who provided the TJM treatment used in the clinical trials that were used to develop the favorable recommendation noted in the established guidelines.⁶ Of the 27 studies included in these systematic reviews, only five (18%) studies used chiropractors to provide the manipulation, compared with 12 (44%) studies that used PTs to provide the manipulation. The remainder of the studies used physicians and osteopaths. More recently, PTs have completed the vast majority of quality research demonstrating the effectiveness of TJM for treatment of low back pain.^{5,45,46,47,48}

PTs also are leaders in TJM research for patients with neck pain. The neck pain clinical practice guidelines also tend to support a multifaceted treatment approach that combines non-thrust or thrust manipulation with specific therapeutic exercise programs.⁵¹ Recent research completed by PTs supports the use of TJM techniques for the thoracic spine as part of the treatment for neck pain, and the combination of specific exercise with manual physical therapy for treatment of neck pain and headaches.^{39, 49, 50, 51, 52} The fact that physical therapist researchers and clinicians are leading the way in demonstrating the effectiveness of TJM further illustrates that PTs are safe and effective providers of TJM for treatment of spinal disorders.

Summary

Based on the coordinated, strategic chiropractic legislative activities during the past 20 years, it is clear the chiropractic profession has established a national agenda to prevent PTs from using TJM. Their claims that PTs are not adequately trained and that patients are at risk receiving TJM from PTs have no factual basis. The practice of TJM by PTs is based on research evidence and is just one intervention among many used by PTs to relieve pain and restore function.^{53, 54}

Interestingly, the *Future of Chiropractic Revisited: 2005-2015*⁹ contains numerous statements noting

that PTs apply TJM techniques. In addition, groups including the Veterans Hospital Association, US Department of Health and Human Services, and the Virginia Board of Medicine, have concluded that TJM is in fact within physical therapists' scope of practice. This provides support for the premise that attempts to limit PTs from using TJM is based on economic concerns—not patient safety.

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