Capstone Project II

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The Physical Therapists' Role as a Musculoskeletal Primary Care Giver:

Assisting Employers in Managing Workman's Compensation and General Health Costs

(Final Submission)

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The Physical Therapists' Role as a Musculoskeletal Primary Care Giver:

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Abstract

Musculoskeletal problems make up a large portion of both workman's compensation and general healthcare costs, and most of these costs are paid by employers. This professional perspective paper promotes the position that the current approach to managing musculoskeletal problems is inappropriate and inadequate and that comprehensively trained physical therapists should work with employers and the general public to serve as primary care givers for the musculoskeletal system. Furthermore, most musculoskeletal conditions should not be treated as episodic events of a disease or pathology but as progressive movement system disorders. Left uncorrected, these movement system disorders can lead to pain, dysfunction, degeneration and ultimately significant disability.

Opposition to physical therapists serving in a primary care provider role centers on three principal talking points: the adequacy of physical therapy education, licensing and scope of practice rules; the concern for public safety; and the economic concern regarding over utilization and excessive cost of physical therapy services.

The current model of orthopaedic physical therapy will be described and critiqued. A proposed new model of orthopaedic physical therapy will be described and supported. The three main talking points of the opposition to the proposed new model will be individually addressed and refuted with support of the published research.

The final component of this paper will describe the systematic and progressive implementation of this new model of physical therapy delivery and its economic impact on a single manufacture with various geographic sites.

Introduction

Workman's compensation and general health costs paid by employers continue to rise at alarming rates.[1,2] There is an increasing amount of evidence connecting the lifestyle choices and behaviors of employees to general healthcare and workman's compensation costs.[1,3-6] Conditions associated with the musculoskeletal system make up a significant portion of these costs.[7-16]

In this professional perspective paper, a new delivery model of comprehensively trained orthopaedic physical therapists serving as musculoskeletal primary care givers will be described, supported, and contrasted to the current delivery model for addressing musculoskeletal conditions. Our operational definition of musculoskeletal primary care givers is as follows: comprehensively trained orthopaedic physical therapists that would be the initial healthcare providers consulted for complaints of musculoskeletal pain, functional impairments and mechanical or neuromuscular movement issues. In addition to evaluating and treating the traditional orthopaedic problems, the proposed new model states that these therapists should focus on prevention, early intervention and proper management of general health and workman's compensation musculoskeletal claims. As described by William Boissonnault[17(ix)], primary care goes beyond the concept of direct access to physical therapy and should include prevention, lifestyle changes and behavior modification.

Cited publications will be presented that demonstrate that physical therapists with advanced training in orthopaedic manual and exercise therapy achieve improved outcomes and more cost effective care over their peers without the advanced training as well as all physician subgroups except orthopaedic surgeons.[16,18-26] Additional publications will show that musculoskeletal claims can be reduced with the implementation of ergonomics and functional testingprograms.[9,27-29] With this in mind, physical therapists with advanced training in orthopaedic manual and exercise therapy, functional testing and ergonomics would be best suited to serve as musculoskeletal primary care providers. With this specific training, physical therapists would be uniquely qualified to assist employers in the prevention and proper

management of musculoskeletal conditions in both the workman's compensation and general health systems.

In spite of strong supporting evidence, opposition from other healthcare professionals does exist to the proposed new model of addressing the musculoskeletal system.[30] The proposed barriers or main talking points of the opposition are: inadequate physical therapy education, licensing, and scope of practice rules; public safety; and physical therapy over utilization and excessive costs.[30] I will show that the published research clearly refutes each of these talking points.

The final section of this professional perspective paper will describe the economic impact of this new delivery model on a single manufacturing employer with multiple geographic sites. Comprehensively trained physical therapists acting as musculoskeletal primary care givers for this employer will be shown to have had a significant and positive impact on individual employee conditions as well as the overall workman's compensation and general health costs associated with the musculoskeletal system. Ultimately, I will show that there are no true barriers, but only a need for a greater understanding of the value of this new model, to motivate orthopaedic physical therapists to migrate toward being primary care givers for the musculoskeletal system and to work more closely with employers.

Current Model of Orthopaedic Physical Therapy

Description of the Current Model

Today's physical therapists work in many different clinical settings on a wide variety of clinical diagnoses. These clinical settings can include acute care hospitals, skilled nursing units, neurological rehabilitation units, wound care facilities, burn centers, outpatient orthopedic clinics, pediatric programs, sports teams, and many more. Clinical diagnoses can span from pediatric developmental disorders (i. e. cerebral palsy, Down syndrome, etc.), through repetitive micro trauma or acute traumatic

injuries, to conditions typically associated with advanced age or chronic diseases (i. e. stroke, cardiac rehabilitation, osteoarthritis, etc.). Physical therapists also work with patients that have undergone surgical interventions.[31] The focus of this paper is centered on orthopaedic settings and conditions.

Even though many states allow physical therapy direct access, access to physical therapy without a physician referral, Medicare and many commercial payer sources will not pay for physical therapy without a physician referral.[30] Consequently, most of the patients receiving physical therapy under the current model do so after first entering the traditional medical system.

Physical therapy intervention in the current model, even where direct access in permitted, often follows a biomedical model, where referring physicians and many physical therapists strive to label the patient with a pathology, a disease or a specific tissue impairment.[6] The biomedical or physician model is very valid and is extremely appropriate when the patient is afflicted with a true pathology, disease or specific tissue impairment.[6,32-35] Examples might include diabetes, kidney disorders, liver dysfunction, cancer and other diseases of body systems other than the musculoskeletal system. The labeling of the pathology, disease or specific tissue impairment is critical to the appropriate treatment of these conditions. In the above mentioned disease conditions, and in most diseases of body systems other than the musculoskeletal system, the appropriate treatment of the condition goes beyond just treating the acute flare-ups of the condition.[6,17,36] We don't just provide insulin to the diabetic when their blood sugar levels get too high. We work with them to identify lifestyle habits that lead to poor blood sugar control. We address proper diet, the impact of exercise and stress, and the negative consequences to their eyes, kidneys, heart, etc. of poor long-term blood sugar control. This same type of long-term, lifestyle based treatment approach typically occurs with true diseases of the musculoskeletal system. Diseases such as multiple sclerosis, osteoporosis, rheumatoid arthritis and muscular dystrophy are appropriately treated by the traditional biomedical model, and physical therapy plays an important supportive role in the care of these patients.

In stark contrast to the comprehensive way most of the above conditions are treated, the treatment of many of the patients with musculoskeletal complaints seems to focus on the signs and symptoms of the specific episode or flare-up of the condition.[36] For instance, patients may be labeled with shoulder bursitis or tendinitis where the focus of the treatment is placed upon reduction of the inflammation and associated pain. These patients may receive anti-inflammatory medications or injections and not be referred to physical therapy at all. In other words, the current treatment of most musculoskeletal complaints appears to be episodic in nature and not focused on the continuum of proper lifestyle choices and behaviors, which may be the underlying cause of the conditions.[36]

Inadequacy of the Current Model

The main problem with the current medical model is that many musculoskeletal complaints begin as mechanical or neuromuscular movement issues and are not actually a pathology, a disease or a specific tissue impairment.[12,13,16,36-45] Left uncorrected, these mechanical or neuromuscular movement issues often lead to pain, functional limitations, and a degenerative process that may eventually manifest as a serious medical condition. [9,13,21,36,38-40,42,43,46] The current medical model also tends to deemphasize the concept of prevention, wellness and optimized human function in favor of symptom resolution of the patient's current episode or technical measures of successful outcomes.[13,17(377-390),32] In her book, *Movement System Impairment Syndromes of the Extremities, Cervical and Thoracic Spines*[36], Shirley A. Sahrmann, PT, PhD, FAPTA states:

> "Musculoskeletal pain is treated as if each episode is an isolated temporary inflammatory event rather than a progressive condition that is greatly influenced by lifestyle. Just as the prevailing behavior, if not belief, is that we can eat anything or as much as we want, there is a belief that we can sit or move in any way we want. Unfortunately, nothing could be farther from the truth. We get by with poor postural

and movement habits for a while just like the consequences of smoking and hypertension take a while to cause health problems."

Dr. Sahrmann goes on to write,

> "What still needs to be appreciated is that just 'strengthening' without regard for alignment and movement patterns is short-sighted. Awareness that movement system syndromes are a progressive rather than temporary condition requires a change in physical therapy practice. The immediate alleviation of symptoms does not address the underlying problem and should not be considered the completion of patient management. Our knowledge of kinesiology and the interactions of all the segments of the body is what we bring to understanding musculoskeletal problems. We should not be satisfied by limiting our focus to what tissue is painful—which is the focus of the physician who lacks knowledge of kinesiology."[36]

In the author's opinion, continuing to focus our attention on pain and symptom relief of specific episodes of musculoskeletal complaints or the technical success of surgical interventions instead of rethinking our approach to the musculoskeletal system will continue to yield the same results of escalating costs, progressive levels of impairment and disability, and unnecessary human suffering.

Consider the following patient summary from the author's own clinical experience. A forty-five year old Hispanic male reported an insidious onset of right shoulder pain. He works in a moderately heavy industrial setting. He was sent to the company physician, and his treatment followed a traditional medical model with a diagnosis of shoulder strain. He was placed on restricted duty, prescribed medicine, reevaluated in two weeks and referred to an orthopaedic surgeon. The surgeon performed radiographic and magnetic resonance imaging (MRI) studies, modified his medications, changed his

diagnosis to shoulder impingement syndrome and ordered physical therapy for the reduction of the inflammation and stretching of the shoulder. After two additional weeks of treatment under the revised direction of the orthopaedic surgeon, the patient was getting worse and was scheduled for shoulder decompression surgery.

The author was consulted at this point and took a comprehensive medical history and a detailed history of the onset of symptoms. He then performed a comprehensive manual therapy and movement based physical exam. The patient reported being diabetic for at least ten years. This, plus the insidious nature of the onset of the shoulder complaints and the minor physical impairments noted during the exam, assisted in the development of the recommended plan of action. The connection between diabetes and shoulder impairments, which is supported by the literature,[46] was discussed. The relatively minor but contributory physical impairments were corrected with manual therapy techniques and supportive exercises were begun. His job was modified to eliminate working past ninety degrees of shoulder elevation, which prevented shoulder impingement and irritation. Within one week, he was pain free. He began to gain additional range of motion each month, and his surgery was canceled. During this period of time, he was seen on a monthly basis by the author to monitor his status and intervene as necessary. His exercise program was eventually modified to counter-act the influences of the repetitive movements of his job. During three years of follow up observations, he has demonstrated full range of motion, full function and no reported pain.

Significant cost, suffering and time away from work were averted in this case by removing it from the traditional medical model and intervening with the proposed new model of orthopaedic physical therapy.

Proposed New Model of Orthopaedic Physical Therapy

Description of the Proposed New Model

The diabetic shoulder case described above is an excellent example of the positive outcomes that can be achieved with the implementation of the new model of orthopaedic physical therapy. The proposed new model of orthopaedic physical therapy must embrace the concept of progressive movement disorders of the musculoskeletal system and go beyond the mere reduction of episodic symptoms. Physical therapists working in this new model should be considered musculoskeletal primary care givers, working cooperatively with the rest of the health care community. These physical therapists should have specialized skills and training that should include manual and exercise therapy, functional testing and ergonomics. Musculoskeletal primary care physical therapists can work in a clinic setting or directly within employer sites. In addition to effectively treating acute flare-ups of musculoskeletal conditions, these physical therapists should take the lead in preventing musculoskeletal complaints by working with employers and their employees to identify lifestyle habits and behaviors as well as repeated movement patterns that may create musculoskeletal problems. Through proper education, a wellness or optimum human performance mindset and specific movement or exercise instruction, these musculoskeletal problems can be mitigated before they develop into costly, degenerative conditions.

Support for the Proposed New Model

There is a growing body of evidence that supports the concept of progressive movement disorders of the musculoskeletal system. The first chapter of Dr. Sahrmann's book describes the kinesiopathological process whereby sustained postures and repeated movements can lead to musculoskeletal pain and impairments.[36] This kinesiopathological model includes biomechanical, physiological, neurological, and tissue adaptation components and is influenced by other factors such as age, sex, obesity and activity level.[36] While Dr. Sahrmann's book and other publications comprehensively

explain and support this new physical therapy mindset, many other professional publications have been written that support the concept as well.[10,12,16,21,38-40,42-46,48-55]

Table 1 includes summations of cited publications that describe the presence of musculoskeletal pain or dysfunction and an identified movement disorder.

Table 1: Support for the Connection between Pain, Dysfunction and Movement Disorders

Author(s)	Year Published	Citation Number	Reported Pain or Dysfunction	Mechanical / Movement Faults?
Crowell, M, et. al.	2009	10	Low back pain, L posterior thigh pain	Sever limitation in lumbar flexion, increased accessory motion at L3-4, L4-5, L5-S1
Dankaerts, W, et. al.	2006	12	Chronic low back pain, study	Study was able to demonstrate various motor control impairments in these patients
Tal-Akabi, A, et. al.	2000	16	Carpal Tunnel, awaiting surgery	Study hypothesis: manual techniques to correct movement disorders would show positive patient outcomes. 14 patients in intervention group, 7 patients in control group. Only two patients in intervention group proceeded to surgery, while six in control group had surgery.
O'Sullivan, P, et. al.	2006	38	Low Back Pain	Flexion-related back muscle endurance limitations
Hides, J, et. al.	2011	39	Injury of the Quadriceps, Hamstrings, or Adductor Muscles	Decreased cross sectional area of specific Lumbopelvic muscles, predictive study
Rabbito, M, et. al.	2011	40	Posterior tibial tendon dysfunction	Able to demonstrate differences in arch height, ankle muscle strength, and biomechanical factors in individuals with stage 1 PTTD in comparison to healthy individuals
Wang, H-K, et. al.	2011	42	Middle-portion Achilles tendinopathy	Able to demonstrate differences in rate of force development and maximal voluntary force development between involved and uninvolved LE
Hess, S, et. al.	2005	44	Shoulder region pain	Able to demonstrate differences in rotator cuff timing in throwers with and without pain
Hardwick, D, et. al.	2011	45	Shoulder region pain	Able to demonstrate differences in scapula and humeral movement patterns and their relationship with reported pain
Jaberzadeh, S, et. al.	2006	46	Chronic carpal tunnel syndrome	Able to demonstrate increased excitability of flexor carpi radialis motoneuron pool compared to control subjects, demonstrates CNS remodeling in chronic conditions and suggests we need to think beyond the local tissues

Author(s)	Year Published	Citation Number	Reported Pain or Dysfunction	Mechanical / Movement Faults?
Powers, C, et. al.	2010	48	Knee pain / injury	Demonstrated the influence of hip biomechanics on knee pain and injury
Hodges, P, et. al.	1996	49	Low back pain	Able to demonstrate inefficient muscular stabilization / poor motor control of transversus abdominis in patients with LBP during UE movements
Hodges, P, et. al.	1998	50	Low back pain	Able to demonstrate inefficient muscular stabilization / poor motor control of transversus abdominis in patients with LBP during LE movements

Table 1 Continued

The cited publications highlighted in Table 2 illustrate individual cases where there is evidence of related signs and symptoms in the patient's prior medical history. The existence of related signs and symptoms in each of these cases supports the concept of the progressive nature of musculoskeletal conditions. These cases seem to suggest that the mere elimination of pain or other reported symptoms does not represent a complete correction of the patient's problem.

Table 2: Support for the Progressive Nature of Musculoskeletal Conditions

Author(s)	Year Published	Citation Number	Presenting Complaints / Diagnosis	Related Findings in Prior Medical History or Supporting Information Presented
Crowell, M, et. Al.	2009	10	Low back pain, L posterior thigh pain	3-4 prior episodes of LBP over an 8 year period
Dankaerts, W, et. al.	2006	12	Chronic low back pain, study	Citations given stating the re-occurrence rate of LBP is high and that these disorders develop into chronic problems
Tal-Akabi, A, et. al.	2000	16	Carpal Tunnel Syndrome, awaiting surgery	Inclusion criteria for test subjects: mean duration of symptoms was 2.3 years, other treatment courses not beneficial and surgeon had stated they were candidates for decompression surgery

Author(s)	Year Published	Citation Number	Presenting Complaints / Diagnosis	Related Findings in Prior Medical History or Supporting Information Presented
Rodeghero, J, et. al.	2006	21	Cervicogenic headache	Three low impact MVA, no medical treatment received as a result. Minor HA began several months after second MVA. One month after 3rd MVA, HA intensified and she sought medical and PT help.
Cibulka, M, et. al.	2006	43	Recurrent headaches (12 month history)	History of right sided neck pain two years prior, but no history of HA
Laslett, M, et. al.	2000	51	Low back pain, with some LE radiation	Seventeen year history of LBP, secondary to a fall. Repeated acute flare ups that settled within 1-2 weeks. Reported increasing frequency and slightly changing character. The PT in this case was able to separate this PMH from her current complaints and refer her back to her MD. She was found to have a severe aortic stenosis.
Borgerding, L, et. al.	2007	52	Difficulty walking; pain in the groin, hip, thigh, and buttock region; paraesthesia to posterlateral thigh & into lateral right foot	PMHx of lumbar stenosis with foraminotomy several years prior, the patient was still experiencing LBP and right leg weakness. She indicated this was why she fell. Based upon her PT exam including a patella-pubic percussion test, she was sent back to her MD and found to have a non-displaced hip fracture
Boissonnault, W, et. al.	2002	53	A constant soreness and aching, and a catch sensation in the area of the right side of the sacrum	Recent “recovery” from a contralateral stress fracture and recent return to running. Prior suspicion of hip joint and possible leg length discrepancy. The patient was a competitive runner.
Rosenthal, M, et. al.	2006	54	Right knee pain, twisting injury while running	Similar injury one year prior to this occurrence.
Mechelli, F, et. al.	2008	55	Chronic LBP	Leg length discrepancy, runner until recent LBP flare-up, noted ten year history of episodic LBP, the ability of the PT to determine the minimal level of physical findings ultimately led to a medical diagnosis of abdominal aortic aneurysm

Table 2 Continued

The above group of published studies summarized in Tables 1 & 2 is compelling evidence that movement system disorders, if not fully corrected, can and do lead to pain, dysfunction and degenerative disease or pathology. As orthopaedic physical therapists, we must search out the

underlying cause of the progressive movement disorder, determine whether it has a local, regional or central nervous system component, and address each component that exists to fully resolve the patient's problems.

The second, but equally important component of this new model is to recognize physical therapists as the healthcare professionals that are best suited to be musculoskeletal primary care givers, working in collaboration with our physician colleagues when indicated. Primary care has been defined by the Institute of Medicine, National Academy Press, as "the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing within the context of family and community."[17(ix)] This definition goes beyond the labeling and treatment of an acute flare-up or episodic event of a disease or pathology. Consistent with this definition, orthopaedic manual physical therapists should not only treat musculoskeletal disease and pathology, but should focus on prevention, wellness and optimizing human function, through early intervention and conservative management of musculoskeletal conditions. Physical therapists are trained in human development, anatomy, neuroanatomy, physiology, kinesiology, disease, pathology and more.[56] This proposed new delivery model is in perfect harmony with the American Physical Therapy Association's "Vision Statement for Physical Therapy 2020" (HOD 06-00-24-35), which states:

> "By 2020, physical therapy will be provided by physical therapists who are doctors of physical therapy, recognized by consumers and other health care professionals as the practitioners of choice to whom consumers have direct access for the diagnosis of, interventions for, and prevention of impairments, functional limitations, and disabilities related to movement, function, and health."[17(ix)]

Many published cases illustrating the ability of physical therapists to successfully serve as musculoskeletal primary care givers are included in Tables 3 & 4 later in this paper. The following case, from the author's own patient files, is summarized here to illustrate more completely the efficiency and effectiveness of such a case.

> A twenty-six year old Caucasian female reported neck, shoulder and bilateral upper extremity pain with occasional wrist and hand numbness. This individual worked at a computer workstation doing office work, and there had been no significant changes to her workstation or work load. She was referred to the author for an office ergonomic evaluation. Upon discussing her current symptoms with her, it was also learned that she suffered from aches and pain throughout her entire body, was always tired or fatigued, and had trouble catching her breath with the simplest of activities. She reported first noticing her symptoms about two months prior. She indicated that her symptoms came on gradually but have been progressively getting worse. A brief musculoskeletal screen failed to reveal any significant findings, and her workstation was ergonomically appropriate. After discussing her reported symptoms, it was strongly recommended that she consult her primary care physician. A list of her symptoms and the author's concerns were drafted and sent to her primary care physician. After a physical exam and diagnostic lab work, she was diagnosed with severe anemia and prescribed three times the normal dosage of iron supplementations. Within two weeks, her iron levels were normal, and her symptoms had completely resolved.

This is a clear case where the physical therapist's knowledge of normal and abnormal physiology along with a quality musculoskeletal evaluation process assisted in the immediate referral to a medical colleague and to the successful alleviation of the pathological process that was present. Many additional cases have been cited in the literature and are presented in Table 3 & 4.

The final component that should be included in the proposed new model of orthopaedic physical therapy is an expanded and more direct relationship with employers and their insurance brokers. Physical therapists have been working with or within employers for many years.[9,27-29,38,57,58] It is the focus or mindset of the employer – physical therapist relationship that must be modified to embrace this new model. The employer patient population represents several key opportunities for physical therapists to fully implement the new model and provide significant benefits to employers and their employees.

First, the very nature of sustained work positions and repetitive work tasks gives us the opportunity to identify inherent risk factors and eliminate them. If these risk factors can't be eliminated completely, then properly trained physical therapists can assist employees in specific exercises to counteract any negative impact stemming from these sustained postures and repeated movements.

Second, employers have significant financial stake in the prevention and conservative management of musculoskeletal conditions and claims. In the workman's compensation system, the entire cost is paid by employers and musculoskeletal conditions represent the largest portion of those costs.[7-16] In the general health system, even with costs shifting more toward employees, employers still pay the majority of costs. Musculoskeletal claims are a rising component of general health costs for employers. It is the author's opinion that an enhanced relationship between properly trained physical therapists, in the role of musculoskeletal primary care givers, and proactive employers and insurance brokers can make significant strides in reducing unnecessary costs, unnecessary employee suffering, unnecessary productivity losses and unnecessary profit losses.

List of Services Included in the Proposed New Model

A brief description of the necessary services provided under this new model of physical therapists acting as musculoskeletal primary care givers is provided in Appendix A. A short list of the services is provided below for easy reference.

Prevention / Wellness

- Comprehensive pre-placement, post-offer functional testing (New Hires)
- Ergonomics program
- Health risk appraisal with clinical biometrics
- Proactive "fitness-for-work" evaluations (Current Employees)
- Customized exercise prescriptions

Early Intervention

- Comprehensive manual physical therapy assessment & intervention
- Timely referral to appropriate medical professionals
- Manual and exercise therapy focused treatment approach emphasizing function, not pain
- Analysis of injury / accident to prevent future occurrences

Conservative Management

- Telephonic / electronic consultation & education
- Comprehensive training of local physical therapy clinics, focused on manual and exercise therapy (functional restoration, not pain relief)
- Proactive communication to outside healthcare professionals
- Interaction with workman's compensation and general health claims management
- Objective, safe return to work process

The inclusion of a health risk assessment questionnaire may seem out of place in the above list of services, but the author shares the opinion of other professionals that a quality health risk appraisal questionnaire is a valuable tool for the primary care physical therapist.[6] Keeping with the concept that providing primary care, even with a musculoskeletal focus, carries with it an obligation to assist patients with their overall health and wellness, the health risk assessment questionnaire can efficiently identify lifestyle choices and behaviors that have proven to lead to debilitating and costly medical conditions.[1,6,17(377-390)] Risk factors associated with the development of many of these costly medical conditions include poor diet, inactivity and a poor understanding or perception of the early warning signs associated with these medical conditions.[1,5,6,17(377-390)] When you consider the vast knowledge base of today's physical therapist related to normal human physiology and underlying mechanisms of various medical conditions, I concur with the following statement made by William Boissonnault,[17(ix)]

> "Considering the length of time that therapists tend to spend with patients and families and the rapport that can be established, combined with quality examination skills, the physical therapists is in a prime position to be a strong advocate for the health and wellness of those we serve."

Opposition to the Proposed New Model: Validity of Major Talking Points

Although the information presented thus far and in the remainder of this paper demonstrates the need for modifying the way the musculoskeletal system is addressed, opposition does exit. Efforts from organizations such as the American Medical Association (AMA) and other such stake holders at the National and State level strive to block physical therapists from serving in a direct access or primary care role.[30] The three main talking points or positions from these organizations are discussed below.

A close examination of these talking points and the related published data will show that there is no factual basis for these arguments. The public and employer base must be educated on the facts

associated with these issues, so that the value of the proposed new model for the musculoskeletal system can be fully embraced.

Physical Therapy Education, Licensure Process and Scope of Practice

The opposition to modification of the way the health care community addresses musculoskeletal health promotes the position that physical therapists do not have adequate education, proper licensing or appropriate scope of practice rules to have direct access or serve as musculoskeletal primary care givers.[30,59,] As recent as 2009, the AMA Scope of Practice Data Series on Physical Therapists[30] repeatedly criticized the education, licensure and scope of practice of physical therapists and claims that allowing direct access or musculoskeletal primary care physical therapy may be potentially harmful to the public. Although this claim of inadequate education, licensure and scope of practice leading to harm to the public is repeated throughout the AMA's document, there is not one cited case in their article that documents any such harm. As a matter of fact, the "current literature" section in the AMA document summarizes a published study, by Sandstrom,[60] on physical therapy malpractice claims that states "incidence of malpractice by physical therapists is low (estimated at 2.5 events/10,000 working therapists/year)." The article goes on to say "physical therapy malpractice incidence in a state was unrelated to public policy related to direct patient access."[60] The AMA article states that the musculoskeletal education of physical therapists is significantly less adequate than that of physicians and the article proceeds to make the comparison to the education received by orthopaedic surgeons. It is interesting to note that there are published articles stating "medical school preparation in musculoskeletal medicine is inadequate,"[35] and "training in nonorthopaedic residency programs is inadequate."[34] This agrees with other published research that will be cited in the "public safety" section of this paper.

Understanding the current state of the educational process for physical therapists, the overall procedure for physical therapy licensing and the appropriateness of the current scope of practice for physical therapists, will further serve to refute this opposition. Today's physical therapists have completed a professional education program at an accredited college or university. Accreditation is granted by the Commission on Accreditation in Physical Therapy Education (CAPTE), and comprehensive information on the accreditation requirements can be found on their WEB site (http://www.capteonline.org/AccreditationHandbook/).[56]

Appendix B contains information from the CAPTE website that highlights the content of today's physical therapy educational programs as well as the expected professional abilities of each graduate. As of 2002, this accreditation is only approved at professional colleges or universities that culminate in a post-baccalaureate degree in physical therapy.[56] All physical therapy programs will have to graduate students with a Doctoral degree by the year 2015 in order to maintain their CAPTE accreditation.[56] According to the 2010-2011 CAPTE Fact Sheet on Physical Therapy Education Programs, 222 of the 227 accredited physical therapy programs in the United States graduate students with a doctoral degree in physical therapy.[61] Courses that include pharmacology for the rehabilitation professional, basic radiology and advanced imaging as well as differential diagnosis of various medical conditions in order to screen for professional referral are important to physical therapists that serve in the direct access and primary care settings and are included in CAPTE accredited graduate physical therapy programs.[17,24,31,56,62-65]

Physical therapists with a Bachelors or Masters degree that desire to take these courses can enroll in Doctoral degree programs or take these classes in a continuing education environment. Continuing education programs are offered by private individuals, professional educational organizations, Universities and even the American Physical Therapy Association (APTA).[31] The APTA is the professional organization that represents physical therapists in the United States and has its origins in 1921.[31] The APTA and other professional organizations offer several advanced certification programs in various

clinical specialties, including orthopaedics.[66] The American Academy of Orthopaedic Manual Physical Therapists (AAOMPT), founded in 1991, developed a credentialing process for orthopaedic manual physical therapy residency programs that includes classroom course work and documentation of practical experience under the direction of an expert physical therapist. This residency process culminates with oral, written and live patient exams. Successful graduates of these residency programs are awarded Fellowship status by the APTA, which is then recognized by AAOMPT.[67]

Most states require licensed physical therapists to receive hours of continuing education in order to renew their professional license.[2] The initial licensing of a physical therapist occurs in each State in which they desire to practice after they have graduated from an accredited physical therapy education program and passed a National Physical Therapy Exam.[2]

Chapter One of the APTA's Guide to Physical Therapy Practice lists the following roles for physical therapists in its Scope of Practice section: primary, secondary and tertiary care; prevention; and the promotion of health, wellness and fitness.[68] The specific scope of physical therapy practice is also determined in each of the States can vary slightly between States. The AMA Scope of Practice Data Series on Physical Therapists states that efforts are being made by physical therapists across the country to expand their scope of practice beyond their educational and licensure abilities.[30] The AMA article implies that physical therapists are trying to circumvent the place of physicians in the care of musculoskeletal conditions. In the opinion of the author, efforts to adjust the physical therapy scope of practice in many states coincide with the educational, licensing, safety record and expertise of today's orthopaedic physical therapist. This professional opinion is supported by the published research cited in this paper and elsewhere in the public domain. The author also believes that physical therapists and physicians should work together, each within their respective area of expertise, to ensure the most efficient, effective and safe clinical and functional outcomes for our patients.

Patient Safety

In the role of musculoskeletal primary care giver, physical therapists may be the first healthcare professional that patients or employees will see when they develop a musculoskeletal condition or complaint. With physical therapists serving in this new delivery model, physical therapists must take responsibility for identifying red flags that raise suspicion of pathology or disease or other medical conditions that fall outside the scope of physical therapy practice. These cases should be referred to our professional physician colleagues for further diagnostic workup and required treatment. Physical therapists should take on this responsibility even if the patient is referred to them by a physician.[33,68]

Opponents to physical therapy direct access and physical therapy primary care argue that patient safety is at risk if patients do not see a physician prior to being referred to physical therapy.[24,30,59] Studies do exist that would tend to support this position.[69] However, the overwhelming majority of studies refute this point. The ability of today's physical therapist, operating with direct access, to properly identify red flags or other warning signs and keep their patients safe has been documented on numerous occasions.[10,24,54,70-73] Table 3 summarizes several publications related to this fact.

Table 3: Patient Safety with Direct Access to Physical Therapy

Author(s)	Year Published	Citation Number	Presenting Complaints / Diagnosis	Caution / Red Flags and Final Medical Diagnosis
Crowell, et. al.	2009	10	Low back pain, L posterior thigh pain	Change in neurological status (sudden onset of saddle anesthesia, constipation, and urinary hesitancy), new findings of right plantar flexion weakness, absent right ankle reflex, and decreased anal sphincter tone. Immediate medical referral. Med Dx: Cauda equine syndrome

Author(s)	Year Published	Citation Number	Presenting Complaints / Diagnosis	Caution / Red Flags and Final Medical Diagnosis
Ardleigh, K, et. al.	2006	24	Study measuring decision-making ability of physical therapists to make appropriate referrals	Authors cite positive ability of physical therapists to make appropriate referral decisions; cite studies demonstrating that physical therapists score better than medical students, medical residents, general medical physicians and all nonorthopaedic specialties. Physical therapists and orthopaedic surgeons scored about the same. Also documents physical therapists with advanced training scored higher than those without the advanced training.
Rosenthal, M, et. al.	2006	54	Medial knee pain	Minimal mechanical impairments on initial evaluation, progressively worsening condition in spite of decreased activity, WB worse than NWB, focused tenderness to palpation, localized pain from US application to tender area (suspicious of stress fx). Referred to MD. Med Dx: Stress Fx
Fink, M, et. al.	2006	70	Worsening left knee pain over last four days	Two twelve hour trips where he was seated. Pain began after first trip and got significantly worse after second trip. Prior DX of mild left lateral calf strain 2 weeks prior, insidious onset. 2+ pitting edema in left LE, elevated skin temperature, extreme tenderness to palpation, severe and limited left lower leg pain with both active and passive ROM. Immediate referral. Med Dx: Deep Vein Thrombosis
Constantinou, M, et. al.	2005	71	Painful mass in the right calf	Insidious onset, 5 year history with increased prominence recently, increased pain with significant walking and immediate pain with crossed leg sitting, local palpable tenderness. Referred to MD. Med Dx: hemangioma

Author(s)	Year Published	Citation Number	Presenting Complaints / Diagnosis	Caution / Red Flags and Final Medical Diagnosis
Ross, M, et. al.	2005	72	Low back pain, intermittent with occasional tingling in LE	Although there was some mechanical nature to the pain, this was variable. Most severe pain was in the evening, falling asleep and occasionally would be woken up by the pain. Non-capsular pattern of hip restriction. Patient was told to schedule a MD visit which was scheduled twenty days out. Mechanical treatment was begun, but the patient worsened. Information about the patient was forwarded to the physician. Med. Dx: Small cell carcinoma with multiple areas of bony metastases including the low back and sacrum
Goss, D, et. al.	2004	73	Left ankle pain	Mechanism of forced injury, audible "pop", significant decreased WB during stance phase of gait, decreased ROM, pinpoint tenderness, raised palpable defect noted. Crutches and immediate referral to MD. Med Dx: Displaced, distal fibular fx, surgical intervention

Table 3 Continued

Table 4 summarizes additional cases where patients were referred to physical therapy after seeing one or more physicians, only to have the physical therapist identify non-musculoskeletal signs and symptoms of concern.[22,51,-53,55,74-82] These patients were referred back to their physicians by the physical therapists. Appropriately, the physical therapist did not attempt specifically identify the exact nature of the underlying pathology but did make a prompt referral. The author agrees with Boissonnault and Goodman[33] that the place of the physical therapist is identification of warning signs or medical screening to determine the appropriateness of physical therapy services and the need for medical referral. Many musculoskeletal or other disease conditions require imaging, laboratory tests or other diagnostic

procedures in order to properly diagnose the condition. This is the realm of the physician, not the physical therapist.

Table 4: Patient Safety after Physician Referral to Physical Therapy

Author(s)	Year Published	Citation Number	Presenting Complaints / Diagnosis Previously seen by (Physician Type)	Related Findings in Prior Medical History
Mitken, P, et. al.	2008	22	Intractable headaches Neurologist	Two year history of intermittent LOWER EXTREMITY paresthesia, positive transverse ligament test in supine, Sharp-Purser test immediately resolved symptoms. Immediate referral. Med Dx: Os Odontoideum
Laslett, M, et. al.	2000	51	Low back pain, c/o dominant bilateral buttock pain with some discomfort in the midline at L/S junction, minor radiation into posterior thigh and calf Primary care physician	Significant increase in pain with walking. Significant decline in ability to walk noted most recently. Bilateral buttock pain. Simply standing still resolved buttock pain. Mechanical exam was mostly normal, small extension limitation in lumbar spine, bicycle test positive for Bil buttock pain, 2 min rest while still sitting and pain was gone. Referred to MD for additional diagnostic work up, suggesting vascular claudication possibility. Med. Dx: Significant aortic stenosis
Borgerding, L, et. al.	2007	52	Hip contusion, secondary to a fall Primary care physician	Age, recent fall on hip, difficulty WB, pain in groin, hip, thigh, and buttock region, paresthesia into posteriolateral thigh down to lateral right foot. Reported a "jammed up" feeling in the hip. Constant pain even in NWB/sleeping position, limited hip ROM with pain at end range in all directions, positive patella-pubic percussion test. Referred back to MD. Med Dx: non-displaced hip fracture

Author(s)	Year Published	Citation Number	Presenting Complaints / Diagnosis Previously seen by (Physician Type)	Related Findings in Prior Medical History
Boissonnault, W, et. al.	2002	53	Right sacral pain, stress fx suspected, MRI scheduled 14 days Primary care physician	Recent history of contralateral sacral stress fx, premature return to significant running, focal pain and tenderness, report of a 'catch' in the area with specific movements, cleared lumbar spine and hip, sacral rotation noted. Referred back to MD. Med Dx: Sacral stress fx as suspected
Mechelli, F, et. al.	2008	55	Low back pain Primary care physician	Long standing history of episodic LBP, this was NOT the same. insidious onset of unrelenting, deep, boring pain, irrespective of movements or posture changes or time of day. Unremarkable exams for lumbar spine, pelvis or hip joints. Strong, nontender, palpable pulse over left lumbar region. Referred back to MD with concerns noted. Med Dx: Abdominal aortic aneurysm
Boeglin, E, et. al.	1995	74	Low back pain Primary care physician	Insidious onset. Intensity of pain. Minimal progress over several weeks of treatment. Reported pain in wrist. Appeared swollen, hot and had significant decreased ROM. Concerned about infection. Referred to ER. Med Dx: Wrist and lumbar osteomyelitis
Stowell, T, et. al.	2005	75	Musculoskeletal back pain and paraspinal spasms Primary care physician	Insidious onset. Diffuse location of pain. Constant pain, but could be exacerbated by prolonged sitting. Right sidelying, slow walking and pain meds reduced pain. Pain significantly disrupts sleep. Two prior abdominal surgeries. Severe Abdominal pain with minimal ex. Abdominal screening necessitated immediate referral to ER. Med Dx: Severe abdominal impaction

Author(s)	Year Published	Citation Number	Presenting Complaints / Diagnosis Previously seen by (Physician Type)	Related Findings in Prior Medical History
Browder, D, et. al.	2005	76	Hip pain Primary care physician, gynecologist, orthopaedic surgeon,	Insidious onset with steady worsening over a nine month period. Prior PT (different location) for hip mobilization provided only temporary symptom reduction, then it got much worse. Severe gait disturbance, Trendelenburg sign, difficulty sleeping, empty end feel with PROM. Recommended imaging studies of the hip to the PCP. Med Dx: Non-Hodgkin's lymphoma
Erhard, R, et. al.	2004	77	Lumbar herniated nucleus pulposis Primary care physician, urologist, neurosurgeon, and physical medicine & rehabilitation	Insidious onset. Multiple conditions ruled out, two prior failed PT referrals. Unremarkable lumbar findings, positive "sign of the buttock". Immediate referral to MD, suggested specific views of the pelvis/hip region. Med Dx: soft tissue lesion noted, further testing led to dx of primary pulmonary adenocarcinoma with multiple metastatic lesions
VanWye, W, et. al.	2009	78	Lumbar spine and hip osteoarthritis, possible trochanteric bursitis Primary care physician	Pain severity/out of proportion to reported injury, significant night pain, positive "sign of the buttock," empty end feels in all hip motions. Referred back to MD after evaluation. Med Dx: Primary lung adenocarcinoma with widespread metastases, including the left proximal femur
Huijbregts, P, et. al.	2000	79	Cs #1: Shoulder Pain (PCP) Cs #2: Adhesive Capsulitis (Unidentified MD)	Cs#1: Capsular restriction, crepitus in shoulder jt, worsening of condition. Cs#2: Widely variable symptom behavior, insidious onset, muscle atrophy noted, limited A/P ROM with hard endfeel, Excessive ventral translation of humeral head.Both cases referred back to the MD. Med Dx:Ostonecrosis, humeral head

Author(s)	Year Published	Citation Number	Presenting Complaints / Diagnosis Previously seen by (Physician Type)	Related Findings in Prior Medical History
Alnwick, G, et. al.	2008	80	Fibromyalgia Primary Care Physician	Declining history of physical and mental status over last six years. Mechanical exam that did NOT concur with Fibromyalgia diagnosis. Wide array of neurological findings (nystagmus, dizziness with finger tracking, impaired reflexes, etc.), GI symptoms, "jumping" muscle movements, and significant impairment noted via Oswestry. Recommended neurologist referral to PCP. Host of medications being taken. Treated gently until Neurologist visit. Med Dx: SSRI-induced neurologic syndrome, secondary to citalopram (taking for anxiety / depression for six years) Experienced full recovery and RTW after removal of the citalopram
Pellecchia, G, et. al.	1996	81	Left lateral thigh pain with exertion and WB Family physician (told to rest)	Adolescent. Similar pain one year earlier, resolved with decrease in activity. Lumbar spine R/O. Hip with capsular pattern of restriction, FABERE/PATRICK'S test positive. Immediate MD referral. Med Dx: Slipped Capital Femoral Epiphysis
Hegedus, E, et. al.	2006	82	Pelvic pain (vulvodynia) concurrent with upper extremity pain and swelling (tendonitis) Orthopaedic sx (vulvodynia) Unidentified medical practitioner (UE tendonitis)	Recently (several months) of weight lifting and noticed that her right UE appeared larger/swollen after workouts in the last 2 months. This appeared more noticeable within the past week. Bump in axillary region over past three days. Distended veins in subclavian and axillary region, whole UE swelling and cyanotic discoloration of the hand. Ref to MD. Med. Dx: UE DVT (rare version: Paget-Schroetter syndrome)

Table 4 Continued

The cases in Table 4 further document that physical therapists are qualified and capable of identifying serious underlying medical conditions that need the attention of our physician colleagues. The physical therapy direct access model of the United States military serves as the longest standing example of patient safety with successful outcomes as it relates to physical therapy direct access or physical therapy primary care. After a forty month observation period culminating in a 2005 publication, JH Moore, et. al.[83] concluded that "patients seen in military health care facilities are at minimal risk for gross negligent care when evaluated and managed by physical therapists, with or without physician referral." Physical therapists should not strive to work independent from the rest of the health care team but as an interdependent member of a patient-centered team made up of patients, physical therapists, physicians, other health care professionals, employers and payers.[11]

In addition to the above studies referenced in Tables 3 & 4 that document an individual physical therapist identifying the presence of underlying disease or pathology, with or without initial physician referral, there have been other studies specifically aimed at investigating multiple physical therapists' ability to make proper clinical decisions regarding the need for referral to a physician.[11,24,83,84]

Still other studies have compared the ability of physical therapists to various physician types regarding proper medical decisions and professional referrals.[24,84,85] In summary, these studies found that physical therapists were more accurate than medical students, primary care physicians and all physician specialty groups except orthopaedic surgeons regarding musculoskeletal conditions and the identification of the potential for more serious underlying pathology. Physical therapists and orthopaedic surgeons scored at about the same level in these studies.[24,84,85] It should be noted that specific subgroups of physical therapists scored even higher.[35]

The physical therapists that scored above their peers had one or more of the following traits:

1. over ten years experience, with an orthopaedic emphasis
2. greater than fifty percent of their patient load was orthopaedic in nature
3. some indication of advanced training and competency in orthopaedics or manual therapy

While it is clear that the research demonstrates the ability of physical therapists to practice in a direct access or primary care setting safely and with clinical accuracy, it is also clear that specific educational and experience backgrounds better prepare physical therapists for these settings. Specific training, experience or certification in orthopaedics or manual therapy, along with knowledge in the areas of imaging, pharmacology, and medical screening for referral are important to excel in the direct access and primary care setting. Additional training in functional testing and ergonomics would make these physical therapists and excellent strategic partner with employers in their area.

Over Utilization and Runaway Costs

Another position taken by those that oppose physical therapy being provided without physician referral or oversight is the likelihood of overutilization and excessive costs.[30,64] This position is not backed up by the published research. Mitchell and de Lissovoy[59] published an article in *Physical Therapy* that detailed an analysis of over eleven thousand six hundred different individuals that had received at least one physical therapy visit between January 1990 and December 1991. Criteria were developed that defined episodes of physical therapy service and documented whether the claimant had been referred to physical therapy by a physician or sought physical therapy care directly. Three physical therapists, one orthopaedic surgeon and one physical medicine physician were selected to be on the panel that defined the episode criteria and to evaluate the resultant data. In their conclusion, the authors stated that "concern that direct access will result in over utilization of services or will increase costs appears

unwarranted."[59] When compared to direct access cases, the results of the study revealed that physician referred cases resulted in:

1. sixty-seven percent more physical therapy claims
2. sixty percent more physical therapy office visits
3. three hundred twenty-four dollars additional cost for physical therapy
4. one hundred twenty-three percent higher total paid claims per episode ($2,236 for physician referred episodes Vs. $1,004 for direct access episodes).[59]

A more recent study by Jane Pendergast, et. al.,[86] also compared health care use for physician-referred and self-referred outpatient physical therapy episodes. The study period was 2003-2007, and the article was published in *Health Services Research* in 2011. This was a much larger study, encompassing over forty-five thousand episodes of physician referred physical therapy and over seventeen thousand episodes of self referred physical therapy. The results were similar to the Mitchell and de Lissovoy[59] study. Both the number of physical therapy visits and the cost of the physical therapy episodes were lower in the self referred group. In the discussion section of the article, the authors state:

> "Our findings suggest that the role of the physician gatekeeper in regard to physical therapy may be unnecessary in many cases. Health care use did not increase in the self-referred group, nor was continuity of care hindered. The self-referred patients were still in contact with physicians during and after physical therapy. Concerns about patient safety, missed diagnoses, and continuity of care for individuals who self-refer may be overstated."[86]

Highlighting one final study will serve to illustrate the economic value of specially trained physical therapists compared to more traditional therapy approaches or continued care with general physician practitioners. In a randomized controlled study published in the *British Medical Journal in* 2003, Korthals-de Bos, et. al.[25] compared the cost effectiveness of physical therapy (mainly exercise), manual therapy (spinal mobilization) and general practitioner care (physician counseling, education and medication) in the treatment of neck pain of more than two weeks. The authors recruited patients from forty-two different primary care physician offices and randomly assigned them to one of the three groups. The manual therapy group showed faster improvement up to week twenty-six, but was not significantly different by the one year follow-up report. However, the direct and indirect costs of the manual therapy group were approximately one third of the costs associated with each of the other groups.

While this points out the efficiency and cost effectiveness of manual therapy intervention, manual therapy (as defined by this study, spinal mobilizations) should not be practiced in isolation. Manual therapy should be supported and followed with proper exercise prescription (see Appendix A). This study also points out the improved impact on direct and indirect costs of a manual therapy model (even as defined in this study) versus a general (physician) practitioner model.

Economic Impact Analysis of Proposed New Model: A Single Manufacturer with Multiple Geographic Sites

Overview of Employer and Program Implementation

The purpose of the final section of this professional perspective paper is to document the program parameters and outcomes of the progressive implementation of this new delivery model on a specific employer within the United States. This manufacturing employer has approximately eight hundred employees within the United States. There are approximately five principle locations of manufacturing in four states (PA, MD, NC, IL) and many smaller distribution centers located across the Country. One of the facilities has its employees represented by a union. Components of the delivery model described in this paper began at a single location and have progressively spread to additional manufacturing sites over a five year period (2005-2010).

The initial program component at each location was measuring the physical demands of the work, followed by the installation of the pre-placement, post-offer functional testing process. The next step at each location was the installation of an ergonomics component. Finally, onsite physical therapy visits, onsite exercise specialists and training of local physical therapists was initiated at the two largest locations in late 2008. These final components will be added at the other locations beginning in 2012.

Figures 1-7 included below demonstrate the progressive outcomes of various components of the new delivery model as it was implemented across this employer. Each of the figures will be briefly explained as they are presented. As each new component of the program was able to document positive outcomes, the next component of the program was added or a new location was initiated.

Pre-Placement, Post-Offer Functional Screens: Impact on new hire workman's compensation claims

Upon the initial analysis of the historical injury trends and costs of this employer in 2005, it was noted that they had a significant issue with injuries within the first year of employment even though

medical physicals were being performed on newly hired employees. In late 2005, the pre-placement, post-offer functional screening process was implemented in one of the larger facilities. By the middle of 2006, this functional testing was implemented at the second large facility. Three additional locations were added to the program by 2008.

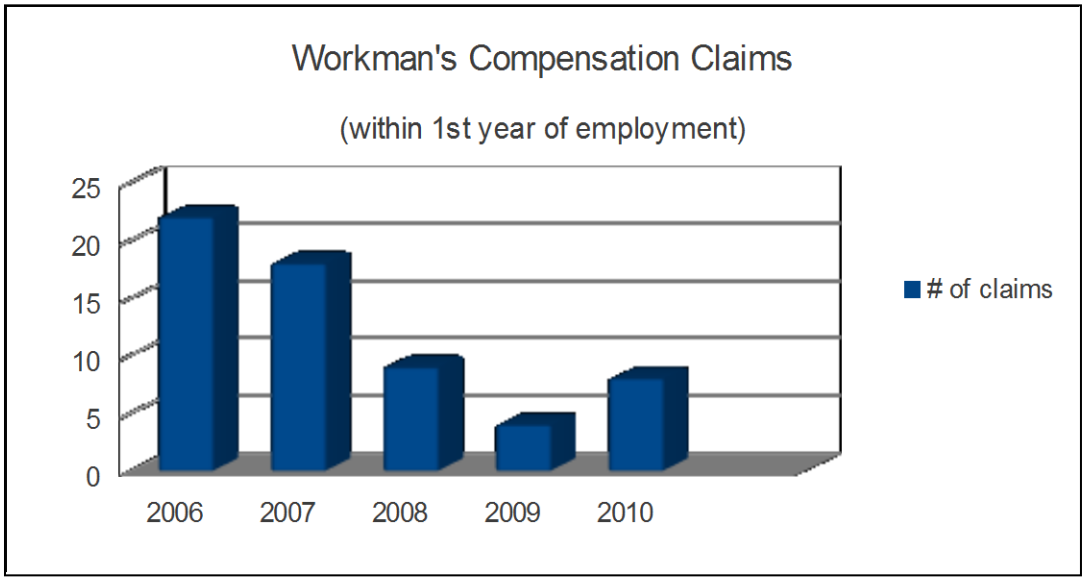

Figure 1.

The reduction in the injury rate of newly hired employees is demonstrated in Figure 1. This figure represents all newly hired employees at all facilities across the United States, not just the facilities where the functional testing was being performed.

When a detailed analysis of the injuries in 2006 was performed, it was noted that in the majority of these injuries, the newly hired employee had been hired without undergoing the pre-placement, post-offer functional screen. As the number of newly hired employees undergoing this new functional screen increased, the injuries within the first year of employment at each of these facilities declined sharply. The company's internal analysis of the slight rise shown in 2010 was attributed to a significant increase in the hiring of new employees across all locations and the additional work hours assigned to these new hires. Even with this slight rise for 2010, the injury rate for newly hired employees within their first year

of employment has been cut by more than fifty percent. This is attributed to the fact that the employer is only hiring people that have been able to demonstrate that they can safely perform the essential functional requirements of the job. Each year, in an effort to improve the outcomes from this functional testing program, a comprehensive review of the program is performed. The following areas are included in this review: 1) comparison of the injured employees Vs. the results of their individual functional test; 2) the performance of each physical therapy center as it relates to adherence to testing protocols and identification of existing impairments; and 3) overall operational efficiency of the program. The success of this program component in the locations where it has been implemented has justified the expansion to new locations in 2011 and 2012.

Workman's Compensation Incidence and Claims Costs

MD Manufacturer: Non-Union Shop

The Maryland facility represented in Figure 2 is where most of the components of this new delivery model were first implemented for this employer, followed shortly thereafter by their largest Pennsylvania facility. The new hire screening began at the Maryland manufacturing site in early 2006. The ergonomics program began in the middle of 2007, and periodic visits from the manual physical therapist began in late 2007. In 2008, the physical therapist's visits became more regular and more frequent, specialized exercise equipment was installed and an onsite exercise specialist was added for approximately twelve to fifteen hours per week. In 2010, local physical therapists began a two year training process that focused upon manual and exercise therapy as well as objective functional outcomes. Employees that are determined by the onsite physical therapist to require more direct and frequent treatment from a physical therapist than can be achieved in the onsite program are referred to the physical therapists that are undergoing this manual and exercise therapy training program. Because of the professional relationship between the onsite and off-site physical therapists, the onsite physical

therapist can continue to be involved in the care of these employees, and they are referred back into the onsite program when appropriate.

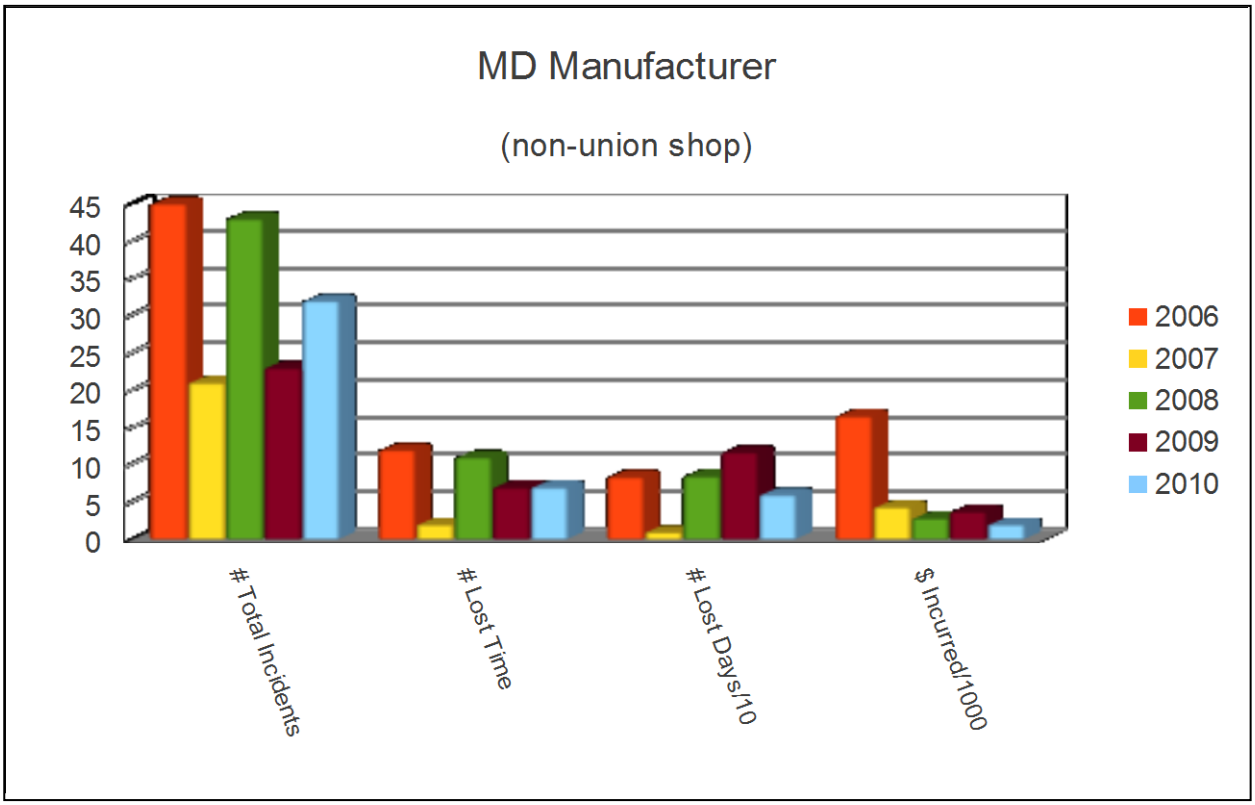

Figure 2.

Figure 2 represents all incidences at this location and is not limited to musculoskeletal issues. When examining Figure 2, consideration must be given to the implementation schedule of the various components of the program as documented above. The overall downward trend in injuries, lost time cases and especially incurred costs closely tracks with the program's implementation time line. In early 2008, there was a rise in injuries and their corresponding lost days. These injuries were ergonomically analyzed and corrective action was taken to prevent any recurrences of these injuries. The decision was made to increase the amount and regularity of the onsite physical therapy visits, to purchase specialized exercise equipment and bring in the supervised exercise personnel. By taking these actions, the specially

trained physical therapist began serving as the musculoskeletal primary care giver for this location and the incurred costs for 2008 and beyond have been significantly reduced. This location also had a primary care physician that had been coming onsite one-half day per week for several years. The onsite physical therapist and the onsite physician began interacting on a more regular basis and began to include other healthcare or insurance professionals. Employees can access the onsite physical therapy and exercise services directly or through the onsite physician even if their musculoskeletal complaints are not work related. Early reporting and early intervention are encouraged. More emphasis by the onsite team and employer representatives will be placed upon total incidence reduction in the upcoming years.

Because of the immediate success noted by the employer on several claims that occurred in the middle of 2008, this enhanced level of the program was implemented at the Pennsylvania facility by the end of 2008. The impact of this action is described below.

PA Manufacturer: Union Shop

The Pennsylvania site closely followed the Maryland manufacturing site related to program implementation. The functional screening of newly hired employees began in late 2006, the ergonomics component began in 2007 and the regular onsite physical therapy visits and exercise specialist began in late 2008.

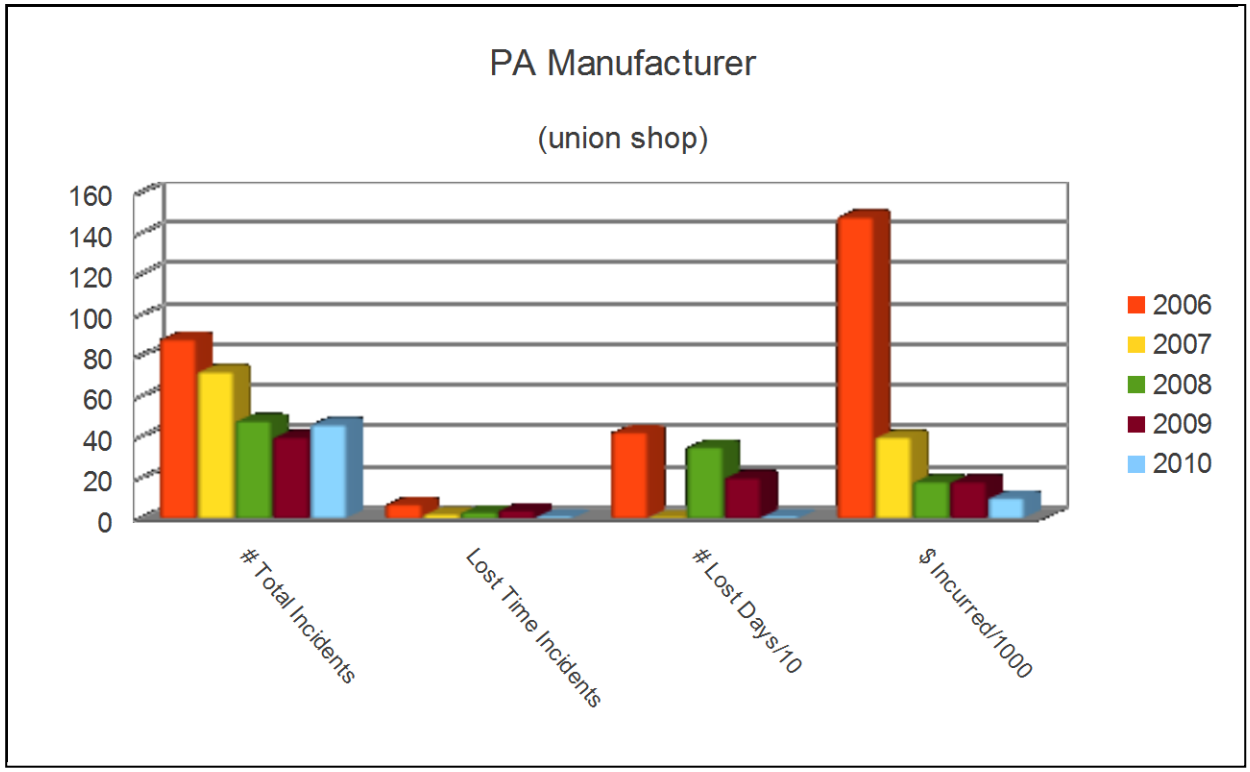

Figure 3.

Figure 3 represents all incidences and is not limited to musculoskeletal conditions. The effectiveness of the progressive implementation of this program can be noted in the significant decline in total incidences, lost time, lost days and overall workman's compensation costs. The overwhelming amount of costs in 2006 can be attributed to two cases. One of these cases was complicated by several pre-existing health issues that impacted the employee's ability to recover from the work related injury. The second case involved a lower leg burn treated in a regional burn center. The health status of the employee was again a complicating factor in this case, and led to the costly inpatient charges associated with this case. These two cases serve to illustrate how poor pre-injury health status of employees can be extremely costly to an employer. It is the opinion of the author that these unnecessary costs may have been minimized or avoided altogether if a properly trained physical therapist had been involved in these cases as musculoskeletal primary care giver, working with the injured employees, their physicians and the insurance adjusters. Validation of this opinion can be seen in the decreased level of disability and costs from 2007 until present in Figure 2 and 3.

Examination of Causes

Even before the installation of this new delivery model at this employer, the employer was tracking the causes of the various workman's compensation claims or incidences. The categories included and their definitions were developed by the employer. Based upon the existing categories and definitions, the installation of physical therapists as musculoskeletal primary care givers within this employer could be expected to impact the ergonomics category, inclusive of personal protective equipment (PPE). The most significant ergonomic risk factors impacted by the onsite physical therapist that related to PPE are contact stress and vibration. Through both the ergonomics training program, implemented in 2007, and direct ergonomic evaluations done by the onsite physical therapist, corrective actions related to PPE that would reduce contact stress and the impact of vibration were taken. Figure 4 demonstrates the positive impact of the ergonomics program across the entire company. Because of the documented success, a component of the original ergonomics program has been placed within the employer's quarterly training program. Although the downward trend is encouraging, there is still room for improvement.

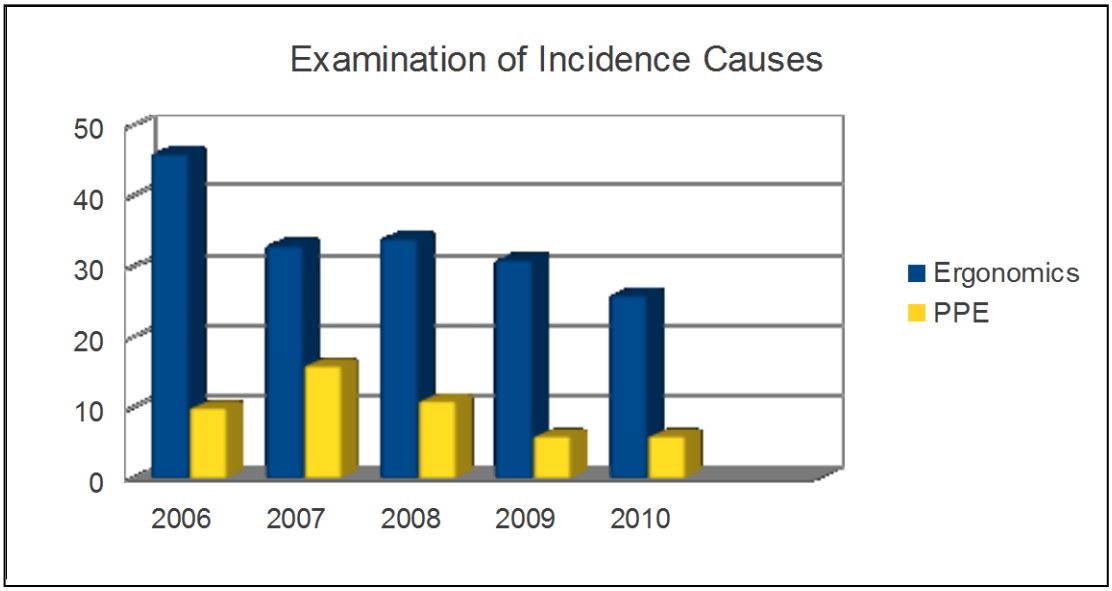

Figure 4.

Surgeries Averted: Workman's Compensation Cost Savings Estimate

Over the eighteen months from July 2009 through December 2010, the author captured data related to surgeries that were averted. In order for a case to be included in Figure 5 and 6, the employee must have been informed by their treating physician that surgery was the next course of action if their current treatment or the onsite manual and exercise therapy program did not alleviate their condition. By the time of this writing, eighteen cases had successfully completed the onsite program and were not in need of surgery. In an effort to estimate the economic impact of these averted surgeries, the company's workman's compensation broker was asked to provide the average medical cost of each surgery as well as the additional indemnity and administrative cost that would have been incurred. Figure 5 documents the number of averted surgeries by type, while Figure 6 is an estimate of the savings from the entire group of averted surgeries.

Surgeries Averted: By Type

Body Part Involved	**# Averted**
Shoulders	6
Wrist / Elbow	5
Low Back	4
Knees	3
Total Averted	**18**

Figure 5.

Estimated Savings: Entire Group

Savings Category	**Estimated Savings**
Medical Savings	$ 327,800.00
Additional Savings	$135, 900.00
Total Savings	**$463,700.00**

Figure 6.

General Health Incidence and Costs for Musculoskeletal Conditions

When outcome measures were being evaluated, the program's affect on workman's compensation injuries and costs were primarily considered. With the implementation of the onsite services in 2008, anyone with a musculoskeletal complaint, with or without a link to work activities, was given permission to see the physical therapist. With this in mind, the impact of the onsite physical therapy visits and the onsite exercise specialist was analyzed with regard to musculoskeletal general health claims.

Data regarding the number and cost of paid claims associated with the musculoskeletal system was requested from the general health insurance carrier for 2009 and 2010. Figure 7 below, shows approximately a ten percent and a fifty-two percent reduction, respectively, in the number and cost of paid claims. Keep in mind, Figure 7 represents the entire company. The demonstrated impact was achieved with the comprehensive services being delivered at only two locations.

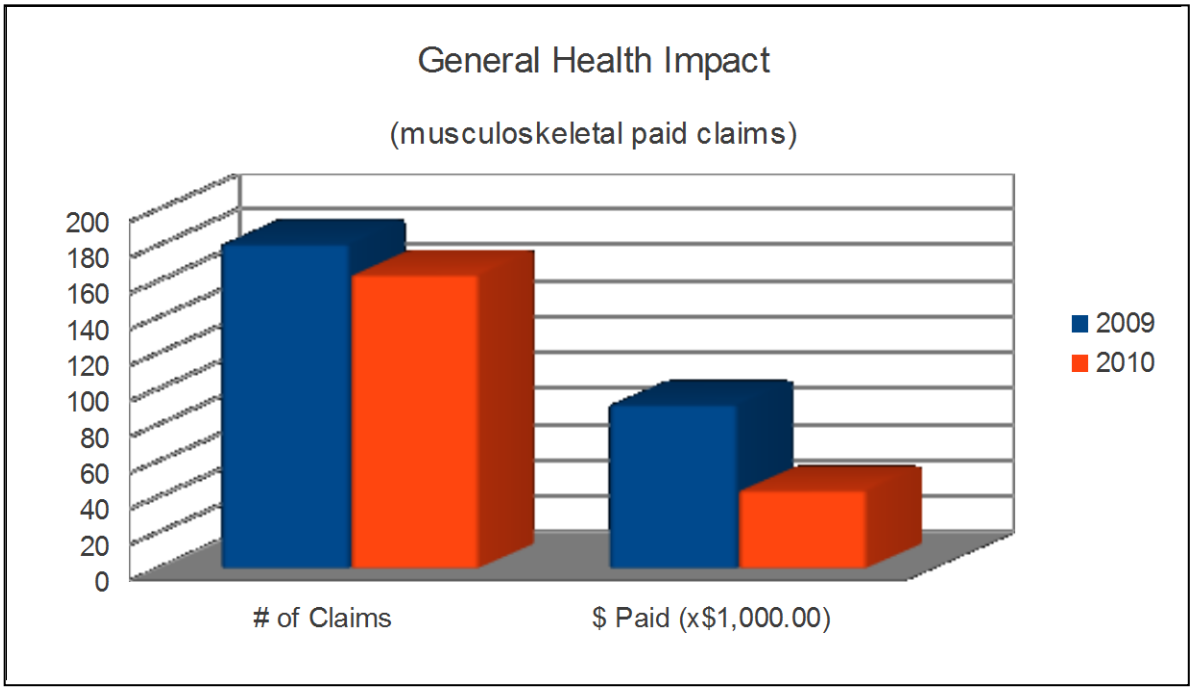

Figure 7.

Summary of Single Employer Case

As presented above, the implementation of the new model of care with manual and exercise therapy oriented physical therapists serving as musculoskeletal primary care providers within an employer was achieved over several years. As each new component or new geographic coverage area was able to demonstrate economic and operational success, a new component or geographic coverage area was added. The program began with a workman's compensation focus and has grown to encompass any and all musculoskeletal problems. The above data shows a decrease in the incidence of musculoskeletal injuries or complaints as well as the costs and disabilities associated with these injuries or complaints. This new model of musculoskeletal care will be expanded with this and other employers, primarily through training physical therapists that are willing to embrace this new delivery model and through employer education.

Conclusion

This professional perspective paper presented the concept that the current method of managing the majority of musculoskeletal complaints is inappropriate, inadequate and needs to be changed in order to effectively and efficiently contain the rising cost of musculoskeletal conditions in the workman's compensation and general health systems. This paper further supports the position that properly trained physical therapists are the most appropriate healthcare professional to serve as primary care givers for the musculoskeletal system, and they should strive to work more closely with employers and their insurance brokers.

In spite of the overwhelming published evidence supporting the positions of this paper, opposition still exists from various special interest groups. The key positions of these groups are centered on the perceived lack of appropriate physical therapy education, perceived safety concerns regarding patients not being seen first by physicians and the potential for over utilization of physical

therapy services. Based on the cited publications in this paper, today's physical therapy educational programs more than adequately prepare physical therapists to act as musculoskeletal primary care givers. To help physical therapists better prepare themselves for this new model of care, additional didactic and clinical training in the fields of manual and exercise therapy, functional testing, ergonomics, pharmacology, imaging and screening for underlying pathology is readily available and is supported by the published research.

Physical therapists, in both direct access and physician referral settings, have demonstrated proficiency in the identification of red flags necessitating the need for physician collaboration. The final area of opposition, centered on over utilization or economic concerns, was refuted through both a review of the published research as well as with the outcome data from the author's manufacturing client.

Physical therapists should take the lead in promoting themselves as musculoskeletal primary care givers to physicians, employers and the general public at large.

Appendix A

Prevention / Wellness

- Comprehensive pre-placement, post-offer functional testing (New Hires): This test is performed in a local physical therapy clinic that has been trained in specific testing protocols to determine a prospective new employee's ability to safely perform the essential functional requirements of the job and to document any existing physical impairments that may place this employee at increased risk of injury to themselves or to others. This test includes a comprehensive medical history and physical exam focused on the musculoskeletal system, job specific functional testing to SAFE MAXIMUM PHYSICAL ABILITIES to determine functional risk level and need for intervention. This test is designed to be detailed and comprehensive and is used when seeking to hire a long-term employee. (Prior to administration of the first test for any given employer, the essential functional demands of each job must be determined and a local testing site must be identified and trained as needed.)
- Ergonomics program: Ergonomics, simply stated, is the process of fitting work tasks to the physical abilities / stature of the employee doing the work. In order to consistently decrease musculoskeletal injuries from an ergonomics program, it is necessary to establish an organized and systematic approach to the ergonomic assessment and intervention process. The **assessment component** should consist of the following steps in the following order:
  - Overall environmental survey for proper lighting, proper space requirements, avoidance of clutter, slip resistant flooring, etc.
  - Assessment of work surfaces for proper height, horizontal distances, sharp edges, etc.
  - Assessment of each work task within a given job from the securing of parts or raw materials, through the production process, to the removal of the finished product.

- Throughout the above steps, the identification of one or more of the five ergonomic risk factors should be documented. The risk factors are: awkward positions / postures, repetition, force required of employee (i. e. lifting, pushing, carrying, etc.), vibration and contact stress.

Once the analysis is complete, the following process should be performed in order to arrive-at the most effective **intervention strategy** at the most effective cost.

- Engineer out or redesign the work to partially or completely eliminate the identified ergonomic risks. This method is preferred as a first step because it does not count on employees following administrative rules. As an example, the height and width of storage shelves or locations can be reconfigured to physically prevent machine parts or products from being stored in inappropriate locations. With a properly designed storage location, heavy items would only fit in locations that are from about mid-thigh to mid-chest, since this is the region of the human body that has the greatest capacity. Lighter, bulkier items would only fit on the lowest shelves near the floor and smaller, lighter items would only fit on the shelves above mid-chest height. Another example of engineering or redesign would simply be to adjust the height of the work surface or horizontal distance (reach) required to eliminate any awkward postures. This type of adjustment will also typically reduce the resultant forces the employee is required to exert in the performance of their job.
- If it is not possible to redesign the work or the redesign does not completely eliminate the identified ergonomic risks, the next step is to place administrative controls to further reduce the risks. As stated above, this is less desirable than redesign, since it requires the employee to be fully compliant with the established administrative controls. Samples of ergonomic administrative controls would include but not be limited to

assistive devices (pallet jacks, overhead hoists, ergonomic tools, etc.), two person lifting protocols, individual lifting limits, storage bin weight limits, job sharing / job rotation, etc.

- The final step in a proper ergonomic intervention strategy would be the use of personal protective equipment, such as steel toed / non-slip footwear, anti-vibration gloves, eye and ear protection, etc.

An effective ergonomics program can be carried out in two primary ways. For small to medium employers, an outside ergonomics specialist or team can be brought in to perform ergonomic assessments of high risk work stations or work tasks. For larger employers, front line supervisors or floor production workers can be organized into an ergonomics team and trained in the process of performing a quality ergonomic assessment. These two methods can of course be combined to more effectively serve an individual employer's needs. It is also possible to include expert assessments with the use of electronic media as part of the overall program. It should also be noted that office workers can benefit from the ergonomics program as well.

- Health risk appraisal with clinical biometrics: A comprehensive Health Risk Appraisal (HRA) is an in-depth research based questionnaire that each employee completes. A quality HRA identifies specific high risk behaviors as well as current health risks. The addition of clinical biometrics, blood pressure, waist girth, flexibility, fitness testing, heart rate, and specific laboratory tests, can help identify individuals that are at immediate high risk for acute medical events and require immediate intervention. However, the true value of a quality HRA is the identification of individuals that have poor lifestyle behaviors or a combination of unhealthy/at-risk behaviors and biometric/clinical findings. These combinations have been recognized to increase the risk of the development of a serious disease even if the employee does not yet have any clinical signs of that disease. In other words, identifying individuals even before their clinical biometric

measures are borderline or abnormal. Preventing the disease's manifestation will not only avoid employee suffering, but it will reduce or eliminate unnecessary costs. The HRA report not only identifies these individuals, it also provides information on the respondents interest in changing risky behaviors and then details specific instruction in ways to decrease those risks and improve the individual's overall health and fitness. Individual HRA results are confidential, but an executive summary is prepared for the employer's executive team, which identifies specific high risk indicators and costs tied to absenteeism, presenteeism and health care costs. This allows employers to tailor future health programs to meet these identified needs and evaluate behavior and cost impact over time. A preliminary review of HRA data for the sample company outlined in this paper is underway to determine if HRA questionnaires can be used to predict future occurrences of musculoskeletal injuries.

- Proactive "fitness-for-work" evaluations (Current Employees): This voluntary and confidential test is made up of the same components as the pre-placement, post-offer exams with the addition of baseline fitness testing. The fitness testing is made up of a sub-maximal cardiovascular test, various strength tests, flexibility assessments, and body mass index (body composition) calculations. The results of the various tests are put in the form of an individualized report card for each employee and used to design their individual and job specific conditioning program. During their initial exercise training session, the employee will receive instruction in several exercises designed to overcome any musculoskeletal impairments or fitness deficits that were identified. Follow-up assessments can be arranged to track the employee's progress and modify the program as necessary.
- Customized exercise prescriptions: After undergoing a "fitness-for-work" evaluation or a comprehensive manual physical therapy assessment (described below) the employee is given an individualized and specific exercise prescription. The focus of this exercise prescription is to

overcome any underlying impairments that are preventing the employee from functioning at a higher level. The underlying impairments could be decreased range of motion, decreased strength, poor movement control, poor physiological capacity, etc. The exercise prescription would start out with the precise movement patterns, resistance levels and number of repetitions required to overcome the identified impairment. The overall goal of this program would also be to educate the employee so that they can continue to exercise in a proper manner after discharge from this more supervised program. Depending upon the size and need of the employer, this portion of the program can be carried out with the periodic visit of a manual and exercise therapy oriented physical therapist (onsite at the employer or in a properly trained local physical therapy clinic), with the assistance of a properly trained exercise professional or some combination of these professionals.

Early Intervention

- Comprehensive manual physical therapy assessment & intervention: Manual physical therapy assessments and interventions are the cornerstone of this new delivery model. The focus of this type of assessment is to go beyond the identification of the problem tissue and to fully understand the cause of the problem. This new model emphasizes movement system disorders with a primary cause from local, regional, neurological and physiological causes. In other words, we do not want to stop at labeling a shoulder pain as an "impingement syndrome" or "shoulder bursitis," but we need to document movement disorders at the shoulder, neck, ribs, thoracic spine or related soft tissues that are the reason the "impingement" or "bursitis" is occurring in the first place. If we simply focus on labeling the "disease" or "pathology," and treat the specific episode or label, we tend to see the condition reoccur or even progress. The reason for this re-occurrence or progression is that the underlying cause of the condition has not been eliminated. When working with employers, we need to additionally focus on the type of loading and risk for

overloading that exists secondary to the type of work that the employee is doing. Once a problem has been noticed, the intervention should begin "day one" to solve the problem with the least amount of time and cost possible.

- Timely referral to appropriate medical professionals: As documented earlier in this paper, physical therapists serving as primary care givers for the musculoskeletal system need to be keenly aware of the potential for the initial manifestation of a serious disease, disguised as a musculoskeletal problem. When a case like this is recognized, communication and referral to the appropriate medical professional must be facilitated. Pro-actively developing these relationships will assist in a smooth referral process. The consulted medical professional will consider the information provided, perform any additional clinical and diagnostic testing and determine the appropriate pathological diagnosis. The medical professional will then begin the appropriate treatment program, which may or may not include physical therapy.
- Manual and exercise therapy focused treatment approach emphasizing function, not pain: In a true manual and exercise therapy treatment approach, the focus should be on progressive clinical and functional gains and not on pain. With this in mind, it should be noted that the employee should be given a screening evaluation on each and every visit to determine if clinical and functional gains made over the last treatment session have been maintained. Current session treatment interventions must be based upon the current, up to the moment, clinical and functional picture. There are many components of a comprehensive approach to manual therapy treatment. The overriding principle that should be adhered to is that we need to strive toward the following achievements or goals: full active, passive and accessory movements at the involved and all contributing joints; full lengthening, shortening and widening of contributing muscles; ability of all soft tissue (nerves, blood vessels, joint capsules, muscles fibers, etc.) to freely glide upon one another; appropriate movement pattern throughout the full range of

motion; satisfactory stamina, power, speed and coordination of all functional movements. With the above list in mind, it should be noted that a manual therapy treatment approach must be mechanical, neurological, physiological and ultimately, functional in nature. One of these approaches alone will not accomplish the above listed goals.

Once the required manual techniques have been performed each visit, it is necessary to perform appropriate exercises. Exercise therapy in this model is designed to achieve the following goals: reduction of pain and swelling, relaxation of soft tissue, maintenance of gains made via manual techniques, increases in range of motion and accessory motions, improvement of coordination and movement patterns, increases in strength and stamina and ultimately, satisfactory performance of all functional activities. In order to achieve these goals, careful attention must be paid to the scientific principles that govern exercise and tissue response to outside forces. We also must focus on what the true function of the target tissue is and how it responds to the various parameters of exercise and functional activities. We do not have sufficient time in this paper to address the appropriate prescription of exercise, but we can cover a few important highlights that should be considered.

- Resistance level – Setting the proper resistance level is one of the most important components of exercise prescription. Set the level too low, and there is no need for the tissue to change or remodel. Set the resistance too high, and the tissue could be damaged. With the wrong resistance level, it is possible that the desired muscle or tissue is not even being worked at all. As an example, consider a patient that has pain and an aberrant movement pattern when he gets to about one hundred and ten degrees of shoulder flexion. If we put too much weight in his hand (cuff weights or dumbbells) or on a pulley and ask him to elevate his arm, what we actually have set up is an eccentric/concentric exercise for the shoulder depressors or extensors. The

weight is actually pulling his arm up and he is having to hold it back. Not only are we not stimulating the shoulder elevators, but we may actually be sending a reciprocal signal of relaxation to our target tissue. Exercises must be customized to each patient's individual abilities on a daily basis. In many cases, it is necessary to have specialized equipment or exercise set ups to accomplish the desired level of resistance. Not setting the proper resistance level will slow the patient's progression and even may cause their condition to get worse!

- Range of motion – Working in the proper range of motion is also a critical component of exercise prescription. Here are several items to consider regarding range of motion in exercise prescription. If someone is limited in their end range in a particular direction, their exercise should be performed into that available end range. This would be done to give them increased range, progressing it as available as well as improvement of their strength, stamina and coordination in that new range. In the case of the patient with excessive range or an abnormal motion in the middle of their range, their exercises should be kept away from the ends of their range of motion or focused on the area of their range where the abnormal motion is present. As the excessive range of motion or abnormal movement is eliminated, their exercise range of motion can be increased, so that they can properly function throughout a normal range of motion. Considering the patient described above with the pain at one hundred and ten of shoulder elevation, they should be given two separate exercises that squeeze in on the problem area. The first exercise would be set to work approximately eighty-five to one hundred and five degrees of shoulder elevation. The second exercise would be set to work from one hundred twenty to one hundred forty-five degrees of shoulder elevation. Both exercises should be set up to be active assistive, with the maximum amount of

assistance occurring near the area of the range closest to his problem range of motion (i. e. closest to one hundred and ten degrees).

- Tissue purpose - Not all tissues are designed to do the same thing. Functional movement patterns are made up of multiple tissue types (muscle, bone, joint capsule, ligament, tendon, nerve, blood vessel, etc.) all performing together to function precisely and repetitively. With an acute injury or progressive condition from a movement system disorder, not all the tissues in the functional group have responded the same. For this reason, it is critical to consider what type of tissue is the limiting factor in the desired functional movement. The movement system is addressed as a whole, but each exercise must consider where the most significant limitation is coming from. In our shoulder elevation issue, the functional limitation could be the glenohumeral joint capsule and it's interwoven ligaments; the rotator cuff muscles; the scapular stabilizers; or the large muscles that move the humerus on the trunk. Each exercise needs to keep this in mind. If the weak link is not considered, the patient will begin to move inappropriately and our exercise will not achieve its goal. Each type of tissue has a unique purpose and responds to exercise stimulation in a different manner. For instance, tendons are designed to respond to quick stretches, causing a corresponding stiffening of their respective muscles. This is primarily a protective mechanism. If the problem is in the tendon body or its junction with either the muscle belly or bone and our exercise is slow and smooth, it will take a very long time for the tendon to satisfactorily repair itself. It may not even repair and could actually get weaker. The belly of muscles that are primarily responsible for power and strength respond better to this slow and smooth exercise stimulus. Of course, not all muscles are responsible for power and strength. Some muscles are responsible for stability and

coordination as in the spinal stabilizers or the rotator cuff. These muscles must be challenged in a way that addresses their true functional requirements. As a final thought in this section, stability is made up of both a static (i. e. structural or postural) component as well as a dynamic component. We need to consider this when designing our exercise prescriptions as well.

- Repetition – In many therapy clinics and fitness facilities, three sets of ten repetitions is a very common exercise prescription that will lead to strength gains. This comes from the classical exercise physiology training pyramid where you vary the amount of resistance and the number of repetitions per set to achieve different tissue changes. These changes can include tissue growth or hypertrophy, increased strength and improved endurance. These are three very useful areas for the general public wanting to improve their overall health. In our patient populations, we need to consider exercises that stimulate tissue healing, tissue hyper-oxygenation, proprioceptive enhancement, precise neuromuscular control of movement patterns and more. In many cases, the amount of resistance used to achieve these goals is between five to ten percent of the target tissue's maximum safe load. The required repetitions range from thirty to forty per set up to hundreds of repetitions per set. It is key to understand that the human body has a unique ability to adjust its movement patterns in subtle ways to avoid placing harmful forces on a damaged or weak tissue. This is a classic movement system disorder. Eventually, maybe years down the road, this adaptive movement pattern can begin to create pain and dysfunction from prematurely wearing out tissues that were not intended to perform this abnormal movement pattern. Repetition is king not just for memorization, but in the exercise prescription arena as well. Determine the problem tissue, it's primary functional purpose, the number of repetitions per set that

will stimulate this tissue appropriately, and then set the resistance level to allow for this number of repetitions with a normal, pain free movement pattern.

Following these guidelines when prescribing exercises will pay great dividends for you, your patients, and your employer clients. Not adhering to these principles will prolong the length of recovery and may even cause further degeneration or harm.

- Analysis of injury / accident to prevent future occurrences: Most employers have a process whereby they analyze the sight of an accident to determine it's cause and prevent future occurrences. In many cases, the cause is not clearly determined. The addition of a qualified physical therapist to this analysis can often be of great value. The physical therapist has the unique knowledge to determine what forces were placed upon the worker's frame and tissues as well as how these forces might have contributed to the injury. The physical therapist would be drawing upon a combination of ergonomic assessment skills as well as their knowledge of the human body.

Conservative Management -

- Distance consultation & education: One of the most important components of this new delivery model is the ability for patients or employees to fully understand what is going on with their situation. The model of movement system disorders leading to pain and dysfunction must be fully explained to them. This will help remove the fear that something very dangerous is happening to them and give them hope that they can recover. The best way to help the patients or employees to overcome their fear and appropriately manage their cases is to give them ease of access to information from a credible source. After the employee has formed a strong relationship with the evaluating and treating manual and exercise physical therapist, providing the patient or employee with telephonic and electronic consultation and education can keep the cases both clinically and economically under control. With today's available technology,

therapists can answer specific questions over the phone or through email, share video educational segments or exercise instructions as well as review diagnostic images with patients or employees over secure Internet connections. In the author's experience, simply advising patients about appropriate sleeping positions or ways to reduce pain and get adequate rest has eliminated many late night emergency room visits.

- Comprehensive training of local physical therapy clinics, focused on manual and exercise therapy (functional restoration, not pain relief): In an effort to provide the appropriate amount of service via the correct delivery model for each unique employer, local qualified physical therapy clinics should be found or trained in comprehensive manual and exercise therapy philosophies and techniques. In an ideal situation, these same clinics would be skilled (or trained) in ergonomic principles and functional testing as well. Relevant training or experience in basic imaging, pharmacology and the ability to properly identify and act on the patient's red flags should also be part of the clinic's qualification criteria. This level of advanced skill is not learned overnight. A combined program of quarterly lecture-lab classes coupled with supervised clinical patient interactions over a two to three year period would be necessary. Many clinicians have already secured this level of advanced training or have begun to take steps in this direction. Each clinician's current status should be taken into account when recommending any remaining training. Once a clinic and it's clinicians are deemed appropriately trained in a given geographic area, it becomes quite easy to allow them to service an ever increasing employer client base. The senior clinician in each clinic will serve as a clinical mentor to new therapy staff.
- Proactive communication to outside health care professionals: Pro-actively communicating this model and its benefits to primary care physicians in each geographic market will help keep most clinical and economical cases under control. If we wait to discuss this new delivery model on a case by case basis with these physicians or specialists in the area, we may appear to be

questioning their medical opinion or judgment. Communication with the physical therapy professionals that have undertaken the above mentioned training process is the start. Discussions between the personnel working within each employer and in the outside clinics will only serve to increase the quality of care for the employees and achieve better program outcomes. Working through the professional and personal relationships that the local physical therapists have with medical personnel in their market is a good next step to this proactive communication component. Ultimately, several of the major primary care providers in the area should be part of the team as well as an appropriate number of medical specialists.

- Interaction with workman's compensation and general health insurance and claims management personnel: Another key component of this new delivery model is to proactively communicate the model's design and operational parameters with all individuals involved with the respective insurance plans of each employer. The communication should take place on both a case by case basis as well as in an overall and ongoing educational process. Many of the individuals in both the workman's compensation and general health fields are deeply entrenched in the current healthcare delivery model. With support from this group of individuals, this new delivery model will be patient-centered, outcome driven and cost effective.
- Objective, safe return to work process: The last obstacle in both workman's compensation and general health musculoskeletal cases is the safe and efficient return to work of an employee that has been off of work due to an injury or illness. The detailed knowledge of the physical demands and functional requirements of the job of each employee, which was gathered at the beginning of this process, is a key component to overcoming this obstacle. The physical demands and functional requirements for the various jobs or departments of the employer are organized into return-to-work functional categories. Once an employee is released to work by their treating physician (both workman's compensation and general health cases), the employee can be sent

to the local physical therapy clinic that has been trained to perform the pre-hire, post-offer functional screens. The return-to-work testing protocol will be very familiar and easily administered by this clinic. After the test is performed, the employee is classified into one of the functional return-to-work categories and placed back on the job as appropriate. If there are any discrepancies between the treating physician's documented work restrictions and the functional abilities demonstrated in the return-to-work functional test, these discrepancies may need to be reconciled prior to the employee returning to work. This process will allow employees to be safely returned to work and will reduce the likelihood of further injury. As their condition improves, the functional tests can be repeated and their restrictions modified or removed.

Appendix B

(From CAPTE Web site: Information on Program Content and Professional Expectations)

Curriculum Content

1. The physical therapist professional curriculum includes content and learning experiences in the biological and physical sciences necessary for initial practice of the profession (eg, anatomy/cellular biology, histology, physiology, exercise physiology, exercise, biomechanics, kinesiology, neuroscience, pathology, and pharmacology. Learning experiences in the biological and physical sciences include laboratory or other practical experiences involving quantitative and qualitative observations.
2. The physical therapist professional curriculum includes content and learning experiences in the behavioral sciences necessary for initial practice of the profession (eg, applied psychology, applied sociology, communication, ethics and values, management, finance, teaching and learning, law, clinical reasoning, evidence-based practice, and applied statistics),2(pp97-110) including laboratory or other practical experiences.
3. The physical therapist professional curriculum includes content and learning experiences in the clinical sciences (eg, content about the cardiovascular, pulmonary, endocrine, metabolic, gastrointestinal, genitourinary, integumentary, musculoskeletal, and neuromuscular systems and the medical and surgical conditions frequently seen by physical therapists), including laboratory or other practical experiences.
4. The physical therapist professional curriculum includes clinical education experiences for each student that encompass:

   a) Management of patients/clients representative of those commonly seen in practice across the lifespan and the continuum of care;

b) Practice in settings representative of those in which physical therapy is commonly practiced;

c) Interaction with physical therapist role models whose practice is consistent with the program's philosophy of practice;

d) Opportunities for involvement in interdisciplinary care; and

e) Other experiences that lead to the achievement of expected student outcomes.

5. The physical therapist professional curriculum includes content and learning experiences designed to prepare students to achieve educational outcomes required for initial practice of the profession of physical therapy. The curriculum is designed to prepare students to meet the practice expectations listed below.

Professional Practice Expectation: Accountability

1) Adhere to legal practice standards, including all federal, state, and institutional regulations related to patient/client care and fiscal management.
2) Have a fiduciary responsibility for all patient/clients.
3) Practice in a manner consistent with the professional Code of Ethics.
4) Change behavior in response to understanding the consequences (positive and negative) of his or her actions.
5) Participate in organizations and efforts that support the role of the physical therapist in furthering the health and wellness of the public.

Professional Practice Expectation: Altruism

6) Place patient's/client's needs above the physical therapist's needs.
7) Incorporate pro bono services into practice.

Professional Practice Expectation: Compassion/Caring

8) Exhibit caring, compassion, and empathy in providing services to patients/clients.
9) Promote active involvement of the patient/client in his or her care.

Professional Practice Expectation: Integrity

10) Demonstrate integrity in all interactions with patients/clients, family members, caregivers, other health care providers, students, other consumers, and payers.

Professional Practice Expectation: Professional Duty

11) Demonstrate professional behavior in all interactions with patients/clients, family members, caregivers, other health care providers, students, other consumers, and payers.
12) Participate in self-assessment to improve the effectiveness of care.
13) Participate in peer assessment activities.
14) Effectively deal with positive and negative outcomes resulting from assessment activities.
15) Participate in clinical education of students.
16) Participate in professional organizations.

Professional Practice Expectation: Communication

17) Expressively and receptively communicate in a culturally competent manner with patients/clients, family members, caregivers, practitioners, interdisciplinary team members, consumers, payers, and policymakers.

Professional Practice Expectation: Cultural Competence

18) Identify, respect, and act with consideration for patients‟/clients‟ differences, values, preferences, and expressed needs in all professional activities.

Professional Practice Expectation: Clinical Reasoning

19) Use clinical judgment and reflection to identify, monitor, and enhance clinical reasoning to minimize errors and enhance patient/client outcomes.
20) Consistently apply current knowledge, theory, and professional judgment while

considering the patient/client perspective in patient/client management.

Professional Practice Expectation: Evidence-based Practice

21) Consistently use information technology to access sources of information to support clinical decisions.
22) Consistently and critically evaluate sources of information related to physical therapist practice, research, and education and apply knowledge from these sources in a scientific manner and to appropriate populations.
23) Consistently integrate the best evidence for practice from sources of information with clinical judgment and patient/client values to determine the best care for a patient/client.
24) Contribute to the evidence for practice by written systematic reviews of evidence or written descriptions of practice.
25) Participate in the design and implementation of patterns of best clinical practice for various populations.

Professional Practice Expectation: Education

26) Effectively educate others using culturally appropriate teaching methods that are commensurate with the needs of the learner.

Patient/Client Management Expectation: Screening

27) Determine when patients/clients need further examination or consultation by a physical therapist or referral to another health care professional.

Patient/Client Management Expectation: Examination

28) Examine patients/clients by obtaining a history from them and from other sources.
29) Examine patients/clients by performing systems reviews.

30) Examine patients/clients by selecting and administering culturally appropriate and age-related tests and measures. Tests and measures include, but are not limited to, those that assess:

a. Aerobic Capacity/Endurance

b. Anthropometric Characteristics

c. Arousal, Attention, and Cognition

d. Assistive and Adaptive Devices

e. Circulation (Arterial, Venous, Lymphatic)

f. Cranial and Peripheral Nerve Integrity

g. Environmental, Home, and Work (Job/School/Play) Barriers

h. Ergonomics and Body Mechanics

i. Gait, Locomotion, and Balance

j. Integumentary Integrity

k. Joint Integrity and Mobility

l. Motor Function (Motor Control and Motor Learning)

m. Muscle Performance (including Strength, Power, and Endurance)

n. Neuromotor Development and Sensory Integration

o. Orthotic, Protective, and Supportive Devices

p. Pain

q. Posture

r. Prosthetic Requirements

s. Range of Motion (including Muscle Length)

t. Reflex Integrity

u. Self-Care and Home Management (including activities of daily living [ADL] and instrumental activities of daily living [IADL])

v. Sensory Integrity

w. Ventilation and Respiration/Gas Exchange

x. Work (Job/School/Play), Community, and Leisure Integration or Reintegration (including IADL)

Patient/Client Management Expectation: Evaluation

31) Evaluate data from the examination (history, systems review, and tests and measures) to make clinical judgments regarding patients/clients.

Patient/Client Management Expectation: Diagnosis

32) Determine a diagnosis that guides future patient/client management.

Patient/Client Management Expectation: Prognosis

33) Determine patient/client prognoses.

Patient/Client Management Expectation: Plan of Care

34) Collaborate with patients/clients, family members, payers, other professionals, and other individuals to determine a plan of care that is acceptable, realistic, culturally competent, and patient-centered.

35) Establish a physical therapy plan of care that is safe, effective, and patient/client-centered.

36) Determine patient/client goals and outcomes within available resources and specify expected length of time to achieve the goals and outcomes.

37) Deliver and manage a plan of care that is consistent with legal, ethical, and professional obligations and administrative policies and procedures of the practice environment.

38) Monitor and adjust the plan of care in response to patient/client status.

Patient/Client Management Expectation: Intervention

39) Provide physical therapy interventions to achieve patient/client goals and outcomes. Interventions include:
    a. Therapeutic Exercise
    b. Functional Training in Self-Care and Home Management
    c. Functional Training in Work (Job/School/Play), Community, and Leisure Integration or Reintegration
    d. Manual Therapy Techniques (including Mobilization/Manipulation Thrust and Nonthrust Techniques)
    e. Prescription, Application, and, as Appropriate, Fabrication of Devices and Equipment
    f. Airway Clearance Techniques
    g. Integumentary Repair and Protection Techniques
    h. Electrotherapeutic Modalities
    i. Physical Agents and Mechanical Modalities
40) Determine those components of interventions that may be directed to the physical therapist assistant (PTA) upon consideration of: (1) the needs of the patient/client, (2) the PTA‟s ability, (3) jurisdictional law, (4) practice guidelines/policies/codes of ethics, and (5) facility policies.
41) Provide effective culturally competent instruction to patients/clients and others to achieve goals and outcomes.
42) Complete documentation that follows professional guidelines, guidelines required by health care systems, and guidelines required by the practice setting.
43) Practice using principles of risk management.

44) Respond effectively to patient/client and environmental emergencies in one‟s practice setting.

Patient/Client Management Expectation: Outcomes Assessment

45) Select outcome measures to assess individual outcomes of patients/clients using valid and reliable measures that take into account the setting in which the patient/client is receiving services, cultural issues, and the effect of societal factors such as reimbursement.
46) Collect data from the selected outcome measures in a manner that supports accurate analysis of individual patient/client outcomes.
47) Analyze results arising from outcome measures selected to assess individual outcomes of patients/clients.
48) Use analysis from individual outcome measurements to modify the plan of care.
49) Select outcome measures that are valid and reliable and shown to be generalizable to patient/client populations being studied.

Practice Management Expectation: Prevention, Health Promotion, Fitness, and Wellness

50) Provide culturally competent physical therapy services for prevention, health promotion, fitness, and wellness to individuals, groups, and communities.
51) Promote health and quality of life by providing information on health promotion, fitness, wellness, disease, impairment, functional limitation, disability, and health risks related to age, gender, culture, and lifestyle within the scope of physical therapist practice.
52) Apply principles of prevention to defined population groups.

Practice Management Expectation: Management of Care Delivery

53) Provide culturally competent first-contact care through direct access to patients/clients who have been determined through the screening and examination processes to need physical therapy care.

54) Provide culturally competent care to patients/clients referred by other practitioners to ensure that care is continuous and reliable.
55) Provide culturally competent care to patients/clients in tertiary care settings in collaboration with other practitioners.
56) Participate in the case management process.

Practice Management Expectation: Practice Management

57) Direct and supervise human resources to meet patient‟s/client‟s goals and expected outcomes.
58) Participate in financial management of the practice.
59) Establish a business plan on a programmatic level within a practice.
60) Participate in activities related to marketing and public relations.
61) Manage practice in accordance with regulatory and legal requirements.

Practice Management Expectation: Consultation

62) Provide consultation within boundaries of expertise to businesses, schools, government agencies, other organizations, or individuals.

Practice Management Expectation: Social Responsibility and Advocacy

63) Challenge the status quo of practice to raise it to the most effective level of care.
64) Advocate for the health and wellness needs of society.
65) Participate and show leadership in community organizations and volunteer service.
66) Influence legislative and political processes.

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