

ORTHOPAEDIC

Physical Therapy Practice

THE MAGAZINE OF THE
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VOL. 18, NO. 4 2006

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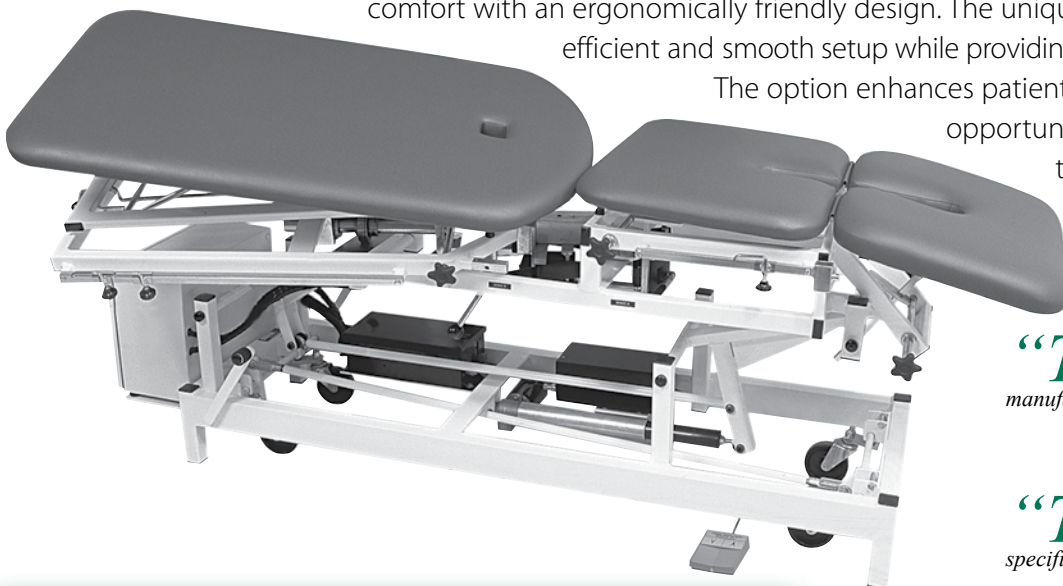
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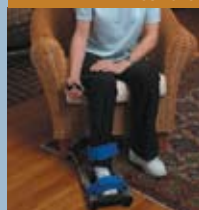


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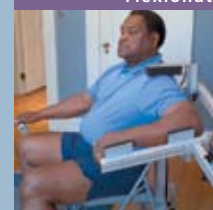


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Physical Therapy Practice

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optmission

The mission of the Orthopaedic Section of the American Physical Therapy Association is to be the leading advocate and resource for the practice of Orthopaedic Physical Therapy. The Section will serve its members by fostering quality patient/client care and promoting professional growth through:

- enhancement of clinical practice,
- advancement of education, and
- facilitation of quality research.

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The Baby Boomers Are Coming: Are We Ready?

Advancements in medical care are extending our life expectancies and broadening the societal definition of middle age. The percentage of middle-aged individuals in the United States continues to grow rapidly. Many baby boomers are involved in recreational activities, primarily as weekend warriors, and are being referred to physical therapy with complaints of joint pain and dysfunction.

The first baby boomers, those born between 1946 and 1964, will begin reaching 65 in 2011. Seventeen percent (50.3 million people) of the total American population will be 65 or older by 2020.¹ Baby boomers are the most educated, largest, and possibly the wealthiest generation ever.² This segment's population growth and unique characteristics have many questioning the need for a different health care approach to meet their medical needs.²⁻¹¹ However, there has been no reported work in the area of baby boomers and physical therapy. Just how will this impact our profession and practice? What should we be doing to prepare for the potential increase in demand for our services? More importantly, we are likely going to be seeing patients that have had previous orthopaedic surgeries that the majority of us have never encountered or learned about during either entry level or postprofessional physical therapy education.

Currently, many therapists are starting to see these patients, who are either wishing to prolong their recreational endeavors or return to an appropriate level of functional activity in the presence of joint related deterioration and injury in conjunction with such impairments as pain and swelling. The recent reduction in the use of Cox-2 specific nonsteroidal anti-inflammatory agents (NSAIDS) such as Celecoxib (Celebrex), Rofecoxib (Vioxx), and Valdecoxib (Bextra) due to the potential higher rate of cardiovascular events as compared to other NSAIDS¹²⁻¹⁶ is contributing to an increased

volume of middle aged patients seeking physical therapy services for their joint related impairments. Even in the era of minimally invasive orthopaedic surgical techniques, many patients seek and require good conservative care, including physical therapy intervention, for their ailing joints.

Many baby boomers presenting to physical therapy clinics these days have had previous surgical reconstructions following joint related injuries that occurred during their younger years. Most of those surgical procedures would be considered primitive as compared to today's standards. As a profession, are we familiar with the limitations and sequelae of those more invasive and less refined procedures? Perhaps not. Today's practicing physical therapist likely is not aware of those factors. Most of today's baby boomers had surgical procedures such as anterior cruciate ligament repairs, patellectomies, or early bankart repairs before most physical therapists were practicing. According to the American Physical Therapy Association's 2002 member survey, 70.4% (19,145) of practicing therapists have 20 years or less of physical therapy experience.¹⁷

How were those earlier procedures done? Was it expected that they might have limited range of motion or function as a result of the surgery? Usually patients do not have a good understanding or recollection of surgical procedures that they have had, especially those that were done many years ago. Most individuals do not keep a very detailed personal medical record. Actually, most Americans keep better records of their automobile maintenance than their health maintenance.

What's the big deal about knowing about what your patient went through 43 years ago anyway? Think about that 60-year-old patient with anterior knee pain that presents to you with a 10° knee flexion contracture and the history of a triad knee injury as the result of a high school football injury. At

that time, the standard surgical reconstruction for such an injury included a complete medial meniscectomy, a medial collateral ligament repair, and a pes anserine transfer to stabilize the posterior medial aspect of the knee to provide stability for the torn anterior cruciate ligament. Would you now aggressively start working on regaining his extension range of motion to improve his knee mechanics? If so, you would likely be doing more harm than good since it was common to have up to a 10° knee flexion contracture from that surgical repair because this type of surgical reconstruction required the knee to be fixed in such a position to maximize knee joint stability. This surgical repair purposely compromised mobility to enhance stability. Surgical advancements and a better understanding of joint biomechanics over the last 20 years has led to a better balance in attempting to preserve mobility while maximizing stability during both the reconstructive and rehabilitation phase of recovery.

So the next time you evaluate a patient in the clinic with new onset anterior knee pain with a history of a surgical reconstruction of their knee 25 years ago due to both a 'ligamentous and meniscal injury,' where do you begin? A complete health screen, focused on identifying potential surgically relevant clinical 'red flags' is crucial. If the patient has a copy of their previous operative report or diagnostic imaging studies it might allow you to have a better understanding of the previous pathology and relevant impairments. An understanding of how that previous pathology may have contributed to the current potential osteoarthritic state of the patient's problematic joint(s) would guide decision making in planning the physical therapy plan of care. Assessment of the patient's quality of soft tissue structures is needed to allow for the creation of the appropriate rehabilitation program to ensure that you do not inappropriately or aggressively stress a tissue. Sometimes our reputa-

tion as physical therapists is that we are too aggressive (ie, physical terrorists) with our patients. If we remain unaware of how previous surgeries (and other past treatments) impact current joint function we may do more harm than good. An interdisciplinary approach, incorporating knowledge from more experienced clinicians, either physical therapists and/or orthopaedic surgeons is a first step. In addition, an evidence-based approach to gathering the appropriate literature on such surgical procedures, and patient outcomes including the long-term sequelae of osteoarthritis should assist the treating physical therapist in the treatment planning process. Sound clinical decision-making is needed to answer numerous clinical questions such as, is one's current motion loss and altered biomechanics a result of their previous surgery or the result of their current impairments?

Long-term strategies should be developed to prepare and assist both entry-level and postprofessional physical therapists to continuously enhance their knowledge base and clinical decision making regarding the treatment and management of the aging, yet active patient. Physical therapy education programs and continuing education courses should address specific content regarding the indications, limitations, and sequelae of older more primitive surgical procedures. However, ultimately it is the responsibility of the clinician to gather and interpret the information they need to treat each patient effectively and safely.

So the next time you see a patient that has had a surgery you are not familiar with, take the time to learn about that procedure, the recovery process, and outcome. This knowledge will guide your clinical decision making regarding the patient's current situation, assisting in the establishment of an accurate prognosis, and selection of the appropriate treatment interventions, which will potentially lead to a better and potentially safer patient outcome.

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president'smessage

Michael T. Cibulka, PT, DPT, OCS
President, Orthopaedic Section, APTA, Inc.

As I write this my last President's Message my hometown team the St. Louis Cardinals have just won the World Series against the Detroit Tigers. A team marked for destiny! The Cardinals barely made it into the playoffs with the worst record for any playoff team, yet they still won despite all of the odds. The team was made up in a self described way as a bunch of 'misfits,' many of the players were discarded from other teams. Many of the veteran players on the team were injured this year and missed good portions of the season, but they persisted and finally won the World Series. After 6 years as President of the Orthopaedic Section I feel like I also won the World Series. Yes, I have had my ups and my downs throughout these 6 years. Personality differences, differences of opinion, and a poor economy led to a difficult start of my season. When I came in as President of the Orthopaedic Section the board was filled with strong personalities who were around for a long time and who believed that what they were doing was right for the Section. I am sure in their mind they really believed that they were right and I was wrong. Right and wrong often depend on perception and how you look at things. However, I learned that sometimes there is no right or wrong just different points of view. I found this to be much the case when I first took over the Orthopaedic Section. These initial differences that I encountered as Section President were not an omen for my futures demise but instead a portal in making me a much stronger and wiser human being. To grow as a person you rarely gain or learn when things are going smooth in your life, but I have found out that you always learn the most when you are pushed to your limit. The St. Louis Cardinals faced much adversity throughout the long baseball season, barely making it into the playoffs. Their hardship that they had to endure prepared them for the World Series. I, though not a champion in any sense of the word, feel like I am going out as a winner. The key to my success, like the Cardinals, was pure persistence; I did



not give up. Importunity can be both a bane and a virtue; just ask my wife. One of my favorite quotes that the late Dr. Steven J. Rose, my research mentor when living in St. Louis, MO had hanging in his office at Washington University was by President Calvin Coolidge. It reads: *Nothing in the world can take the place of Persistence. Talent will not; nothing is more common than unsuccessful men with talent. Genius will not; unrewarded genius is almost a proverb. Education will not; the world is full of educated derelicts. Persistence and determination alone are omnipotent. The slogan 'Press On' has solved and always will solve the problems of the human race.*

During the last 6 years, the Orthopaedic Section has made great strides in fulfilling our Mission and Vision. Nearly every goal of the Strategic Plan we devised 3 years ago have been completed. We have only one more payment to the Foundation for the Clinical Research Network (which we have devoted considerable fiscal support), our Policy and Procedures have been fully revised and organized (including committee structure), our financial situation is back in the 'black,' and we have a balanced budget. The Orthopaedic Section has also set up an Endowment Fund to insure that money is wisely spent on future orthopaedic physical therapy research; to date we have saved nearly \$1,000,000 earmarked for this fund to insure research for orthopaedic physical therapy. Our Independent Study Courses continue to be very profitable. Our most recent initiative, our ICF guidelines, continues to move along within working groups. The ICF guidelines will give practical practice guidelines to therapists in the clinic, help highlight areas where orthopaedic research is deficient and where we need to direct our resources, and last but not least help improve reimbursement by showing the efficacy and value of our practice. Recently a new Strategic Plan was devised by over 23 leaders of the Section; this plan is exciting for we created a new mission with a new vision for the Orthopaedic Section. I have been humbled

by the experience of leading this Section and working with such a wonderful group of people. I will miss them all greatly.

Well being this my last Presidents Message I really must thank all of the people who have made my experience successful and enjoyable. First and foremost I must thank the Section's staff. There is a reason why the Orthopaedic Section's office is located in La-Crosse, Wisconsin, that reason is because of our great staff. I also would like to thank all members of the Board for their commitment and support during my time in office. My sincere thanks for all of the hard work you have done for the Section and the guidance and counsel you have provided to me.

The people I have collaborated with during my tenure have added a very important texture to my life that I will never forget. I hope that each and every member reading this will have an opportunity like I had and that being involved in your Association will give you back much more than what you put in. I can be opinionated, sometimes presumptuous, quick to react, but I do care very much for our profession, I love what I do, I love helping people. I want to thank all of you who have been involved in the Section and hope that those who have not been involved will consider being more involved.

*Orthopaedically yours,
Mike*

CONGRATULATIONS ON BEING SELECTED THE ROSE AWARD WINNER

The paper selected as this year's winner of the Rose Award is,

Brennan GP, Fritz JM, Hunter SJ, Thackeray A, Delitto A, Erhard RE. Identifying subgroups of patients with acute/subacute "non-specific" low back pain. *Spine*. 2006;31(6):623-631.

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May 4-6.....Towson, MD	July 27-29.....Mesa, AZ	November 9-11.....Fort Wayne, IN
May 4-6.....Shelby, NC	August 17-19.....Bethlehem, PA	November 9-11.....White Plains, NY
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March 8-11.....Colorado Springs, CO	June 3-6.....Bay Shore, NY	September 27-30.....Newark, DE
Mar 29-Apr 1.....White Plains, NY	June 7-10.....Everett, WA	October 11-14.....National City, CA
April 12-15.....Bethlehem, PA	June 21-24.....Alma, MI	October 18-21.....Minneapolis, MN
April 19-22.....Elgin, IL	July 12-15.....Milwaukee, WI	October 25-28.....Richmond, VA
April 19-22.....Pocatello, ID	July 12-15.....Madera, CA	October 25-28.....Newport News, VA
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February 22-25.....Homer Glen, IL	May 17-20.....Union, NJ	Sept 27-30.....Pacific Palisades, CA
March 1-4.....Honolulu, HI	June 7-10.....Green Bay, WI	October 4-7.....Milwaukee, WI
March 8-11.....Washington, DC	June 21-24.....Azusa, CA	October 11-14.....West Orange, NJ
March 8-11.....McKinney, TX	June 21-24.....North Charleston, SC	October 18-21.....Pocatello, ID
March 22-25.....Anaheim Hills, CA	July 12-15.....Elkridge, MD	November 4-7.....Bay Shore, NY
March 22-25.....Puyallup, WA	July 19-22.....New York, NY	November 8-11.....Madera, CA
April 12-15.....Chico, CA	August 9-12.....Fremont, CA	November 16-18.....Mesa, AZ
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February 8-11.....Lancaster, PA	May 31-June 3.....New York, NY	November 1-4.....Elkridge, MD
March 8-11.....Milwaukee, WI	September 6-9.....Chico, CA	

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LQ June 7-10.....Homer Glen, IL	Oct 25-28.....Thousand Oaks, CA	UQ July 12-15.....Brooklyn, NY	November 15-18.....Atlanta, GA

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Management of a Patient with Acute Back Pain with Leptomeningeal Carcinomatosis

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Reg B. Wilcox III, PT, DPT, MS, OCS

ABSTRACT

Background and Purpose: The purpose of this case report is to describe the presentation, differential diagnosis, management, and outcome of a patient with Acute Myeloid Leukemia (AML) who presented to an outpatient physical therapy department with complaints of back pain. **Case Description:** The patient was a 20-year-old female diagnosed with AML status post bone marrow transplant, radiation, and chemotherapy whose medical course was complicated by leptomeningeal infiltration. She presented to physical therapy with signs and symptoms consistent with lumbar disc and/or nerve root pathology. The patient's impairments and functional limitations were addressed with physical therapy interventions with the goal of minimizing further irritation to the inflamed nerve roots. **Outcomes:** The patient's strength, mobility, and overall function improved over the course of 3 months of physical therapy intervention. Her disease remained in remission, and there were no further signs of leptomeningeal infiltration upon discharge from physical therapy. **Discussion:** While no literature currently exists regarding effective and safe management of patients with leptomeningeal carcinomatosis, the use of diagnostic imaging and collaboration with the referring oncologist helped to guide the treatment and outcome of a patient who presented with complaints of low back pain.

Key Words: low back pain, leptomeningeal carcinomatosis, physical therapy, differential diagnosis

INTRODUCTION

Leptomeningeal carcinomatosis is infiltration of the brain and spinal meninges and cerebrospinal fluid (CSF) by neoplastic cells; leptomeninges refer to the arachnoid membrane and pia mater surrounding the brain. Cancerous infiltration into the leptomeninges is a serious complication of solid and hematologic cancers that results in substantial morbidity and mortality. In the current case, the patient was diagnosed with acute myelogenous leukemia (AML), a

hematologic disease in which accumulation of neoplastic, immature myeloid cells leads to tissue invasion and bone marrow failure. Her medical course was complicated by cancerous spread into the leptomeninges.

Infiltration of cancerous cells into the meninges typically clusters in areas where CSF flow is slow and where gravity promotes deposition, such as the cauda equina, basilar cistern, and posterior fossa.¹ Patient presentation with leptomeningeal infiltration may include signs and symptoms consistent with obstruction of normal CSF flow and subsequent increase in intracranial pressure. Infiltration of tumor cells in the brain or spinal cord may occur to produce focal neurologic signs, or alteration in nerve tissue metabolism from the cancerous cells may produce diffuse encephalopathy. With infiltration into the brain or spinal cord, patients may present with cranial nerve palsies, radiculopathies, stroke-like symptoms, or seizures.¹ Those patients who present with radicular pain, weakness, and loss of function may appear similar to a patient with lumbar spine nerve root impingement or disc pathology.

Diagnosis of leptomeningeal carcinomatosis is made via lumbar puncture and with diagnostic imaging. With leptomeningeal infiltration, myelography, computed tomography (CT) myelography, and magnetic resonance imaging (MRI) may show thickened nerve roots, nodular masses, swelling of nerve roots, or diffusely increased signal within the theca.² Chim et al described the presentation of a patient with symptoms consistent with cauda equine syndrome. An urgent MRI revealed infiltration of L5 and S1 nerve roots and no compressing mass lesion. A lumbar puncture was performed which confirmed leptomeningeal infiltration.³

Without a diagnostic image to review, a patient with leptomeningeal spread to the cauda equina may present as a confusing or complex clinical picture for the physical therapist. The purpose of this case report is to describe the clinical presentation and management of a patient who presented to outpatient physical therapy (PT) with complaints of back pain whose medical history

included AML status postchemotherapy, radiation, bone marrow transplant, with a medical course complicated by leptomeningeal carcinomatosis. The differential diagnosis of her back pain will be described, which was based on available diagnostic imaging and collaboration with the referring oncologist.

CASE DESCRIPTION

The patient was a 20-year-old female originally from the Dominican Republic who was diagnosed with AML in mid-2004 while in the Dominican Republic. She sought treatment in the United States in August 2004 at which time standard induction chemotherapy began, followed by 2 additional rounds of high-dose cytarabine consolidative chemotherapy. The patient was in remission until February 2005 when a relapse of AML occurred. She was treated with re-induction chemotherapy and a bone marrow transplant donor search began. In March 2005, she was again in complete remission. On April 23, 2005, the patient reported headaches and nausea. An MRI of the brain showed CNS infiltration of leukemic cells. The patient underwent whole brain and total body irradiation and high dose cytoxan chemotherapy. On April 29, 2005, the patient received a matched, unrelated bone marrow transplant. In May 2005, the patient complained of low back pain and radiating symptoms down her left leg. One month later, the patient's pain progressed to bilateral hips, posterior thigh, and lower legs, and she had difficulty with walking. An MRI revealed cauda equina enhancement consistent with leptomeningeal infiltration, and the patient was diagnosed with Leptomeningeal Carcinomatosis (LC) (Figure 1). She received palliative radiation and intrathecal chemotherapy on an outpatient basis. In July of 2005, the patient reported persistent sciatic-type pain down her left thigh, and she was unable to ambulate greater than one block secondary to pain and weakness. The impression from the oncologist at this point was that these symptoms were either due to residual inflammation of the spinal nerve roots from the intrathecal

chemotherapy or a progression of her CNS disease. An MRI of the lumbar spine revealed a similar degree of cauda equina enhancement as compared to the study taken one month earlier; the patient had persistent leptomeningeal involvement. Due to the already large amount of radiation this patient had received thus far, she received an abbreviated course of lumbosacral radiation to assist in minimizing her pain and weakness. In August 2005, the patient completed her second course of radiotherapy, and she reported a decrease in her pain and an ability to walk better. In September 2005, a lumbar puncture was performed which was negative for evidence of CNS or marrow disease. She was seen upon referral from her oncologist

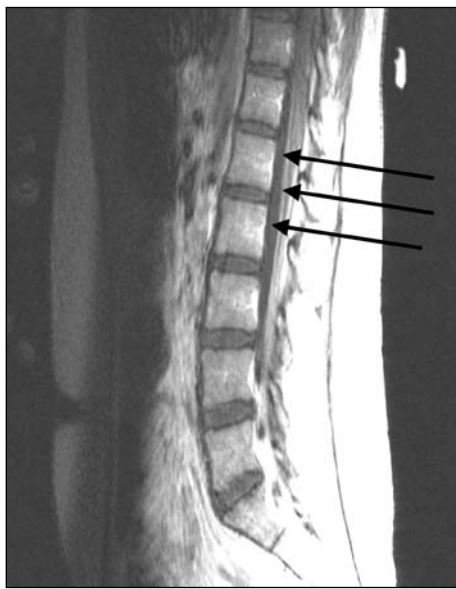


Figure 1. Sagittal plane lumbar spine MRI dated July 19, 2005 which shows cauda equina enhancement consistent with leptomeningeal carcinomatosis. This enhancement is indicated by the arrows.

on September 16, 2005 for an outpatient PT evaluation.

The patient arrived to physical therapy in a wheelchair donning a mask and gloves due to immune suppression precautions. Her chief complaint was constant back pain along the entire spine, the posterior superior iliac spines bilaterally, and the posterior left thigh; all of which caused her to awaken at night. Her goal for therapy was to increase her strength and endurance to maximize her activity level and ambulation.

TESTS AND MEASURES

Neurological screening of the patient's left side revealed a diminished patellar reflex and impaired myotomes of L5/S1 with decreased muscle performance of great toe extension and ankle plantarflexion. Decreased light touch of the dorsum and plantar surface of the left foot in the L5 and S1 distribution was also noted. On the right side, she presented with a diminished patellar reflex and impaired myotome of L5 as decreased strength of the extensor hallucis longus.

The patient's lumbar range of motion (ROM) was limited to 25% flexion with pain and radicular symptoms to the posterior aspect of both thighs and lower legs, 50% extension with pain and radicular symptoms to the posterior aspect of both thighs and lower legs, and 75% side bending bilaterally without change in the patient's report of pain. She was tender with light palpation of her L2 through S1 spinous processes; all cervical and thoracic spinous processes were not tender to palpation.

Muscle performance was assessed by manual muscle testing and revealed generalized lower extremity weakness with significant weakness of bilateral plantar flexors,

great toes extensors, and left foot eversion. Muscle performance was reassessed after 4, 8, and 13 weeks (Table 1).

The patient had pain and radicular symptoms with the straight leg raise test at 20° hip flexion, which is positive for neural tension.⁴ The patient had significant pain and radicular symptoms down the left posterior thigh at 20° of right hip flexion indicating a positive well leg straight leg raise.⁴ Hamstring length was assessed via 90/90 test with the limitation at 0° with pain on the left and limitation at 20° on the right with pain. Given the patient's neurologic presentation, this test was more indicative of neural tension versus actual muscle length. Quadriceps length was assessed using the Ely test⁴ and was positive bilaterally at 90° knee flexion and limited by pain. The positive Ely test may alternately be interpreted as positive for neural tension incriminating L2-L4 nerve roots and/or the femoral nerve with the prone knee bending test.⁴

Functionally, the patient was independent but slow with transfers. She ambulated with minimal handhold assist of her mother without an assistive device and had an antalgic gait with decreased stance time on the left and decreased toe push-off bilaterally, consistent with weak plantar flexors. She used a wheelchair for any distance greater than 50 yards.

Prior to the patient's diagnosis of AML, she was studying to become a medical assistant and only had 2 courses remaining to complete her degree. She was very close with her family and lived with her parents, sister, and brother. Her family was very supportive; the patient's mother attended all appointments but spoke minimal English. The patient reported spending her days at home

Table 1. Manual Muscle Test Strength Grades from Initial Evaluation (September 16, 2005), and reassessments October 14, 2005, November 23, 2005, and December 29, 2005

Muscle Group	September 16, 2006		October 14, 2005		November 23, 2005		December 29, 2005	
	L	R	L	R	L	R	L	R
Hip flexion	4-/5	4-/5	4/5	4/5	4/5	4/5	4/5	4/5
Hip abduction	NT	NT	4-/5	4/5	NT	NT	4/5	4/5
Hip extension, knee extended	NT	NT	4-/5	4-/5	NT	NT	NT	NT
Hip extension, knee flexed	NT	NT	3+/5	4-/5	4-/5	4/5	4-/5	4-/5
Knee extension	4/5	4/5	4-/5	4-/5	4+/5	5/5	5/5	5/5
Knee flexion	3+/5	3+/5	3+/5	4-/5	4/5	4/5	4/5	4/5
Dorsiflexion	NT	NT	NT	NT	4+/5	5/5	5/5	5/5
Plantarflexion	1/5	1/5	2/5	2/5	2/5	2/5	2+/5	2+/5
Great toe extension	1/5	1/5	2/5	2/5	3+/5	4/5	3/5	4/5
Foot eversion	1/5	4/5	NT	NT	5/5	5/5	5/5	5/5
Back extension	3+/5	NT	NT	NT	NT	NT	NT	NT

Key: NT – not tested.

watching television, playing on the computer, and resting. Due to her immune suppression precautions she was discouraged from community exposure and activities aside from hospital visits.

DIFFERENTIAL DIAGNOSIS/ ASSESSMENT

Assessment of the objective findings from the initial evaluation was most notable for involvement of the neurologic system with diminished reflexes bilaterally and impaired dermatomes and myotomes. The patient presented with positive neural tension signs with the straight leg raise, hamstring muscle length, and prone knee bend test. Most alarming was the patient's positive well leg raise test which suggests a disc bulge medial to the nerve root.⁴

Given the exam findings from the initial examination, potential hypotheses to explain this patient's presentation of weakness and neurologic impairments included: a herniated disc that developed over the 2 months since the last MRI, perpetuation of leptomeningeal carcinomatosis in the spinal meninges, or cancerous metastasis to the spinal cord or spinal nerve roots.

The patient's MRI and medical record was accessible through the hospital-wide computer based documentation system. Her most recent MRI, performed July 2005, was reviewed to assess for any noticeable abnormalities, such as a herniated disc. The image showed cauda equina enhancement consistent with leptomeningeal spread, but no disc dysfunction was observed (Figure 1).

After the initial PT evaluation and review of the MRI, the referring oncologist was contacted regarding the patient's current presentation. The oncologist and evaluating therapist felt that the patient's symptoms were most likely secondary to residual inflammation of the spinal nerve roots associated with cauda equina syndrome from the leptomeningeal involvement of the patient's disease.

INTERVENTION

Since the patient's clinical presentation appeared to be secondary to residual inflammation of her spinal nerve roots following cancerous infiltration into the spinal meninges it was decided that PT management and intervention should begin conservatively. The patient's impairments of decreased muscle length, ROM, muscle performance, activity tolerance, and gait dysfunction were addressed with the goal of reducing nerve root irritation by limiting painful neural ten-

sion. The plan of care and rationale are outlined in Table 2.

Week 1-4. The patient was initially seen 2 times per week for PT. Patient education included positioning as outlined in Table 2. It was recommended that she position herself in side-lying with a pillow between the knees for comfort and to facilitate neutral spine alignment. During the first month of therapy, the patient was given basic exercises for a home program including: supine single knee to chest, scapular retraction and glute sets, hooklying lumbar rotation, marching for lumbar stabilization, side-lying quad stretch, hip abduction, clamshell exercises, and prone alternate arm and leg raises. The patient was instructed to discontinue any exercise that exacerbated her pain and to begin with 5 repetitions and progress to 15, without exercising to fatigue or exhaustion. She was encouraged to progressively increase her activity tolerance by monitoring the amount of time she was able to walk prior to the onset of fatigue. Manual lumbar traction performed by the therapist using a belt was used for 2 visits with temporary relief of radicular pain. The patient tolerated 2 minutes of traction the first visit, and after 4 minutes of traction on the second visit, the patient no longer reported relief of radicular pain. The intervention was then discontinued. At the end of the 4 weeks, an upright bicycle was incorporated for aerobic conditioning; the patient was initially only able to tolerate 4 minutes without resistance due to fatigue.

October 14, 2005. The patient was reassessed after one month. Subjectively, she reported that she was 'feeling much better,' with a decrease in fatigue and pain and increase in overall activity tolerance. On verbal analog scale (VAS), the patient reported pain 0 on a scale of 0-10 on a good day, and 4 on a scale of 0-10 after prolonged sitting. The patient's chief complaint was her gait dysfunction as she continued to ambulate with decreased toe push-off bilaterally which decreased her walking efficiency and limited her walking endurance. The patient was no longer using a wheelchair.

The patient's lumbar ROM improved so that she had 50% forward flexion with pain in the posterior aspect of both thighs, 75% side bending with a feeling of stretch without pain, 100% extension, and rotation bilaterally. Neurologically, the patient's patellar and achilles reflexes were normal, but she presented with decreased light touch sensation on the plantar surface of both feet. Muscle performance was again assessed with an overall increase in lower extremity

strength with continued significant weakness of the plantarflexors and extensor hallucis longus bilaterally (Table 1). The patient had a positive slump test and straight leg raise on the left with both tested negative on the right. The patient no longer presented with a positive well leg raise test with passive straight leg raise of the right leg. Quadriceps length assessed with the Ely test which was positive bilaterally 3 inches from the buttock, limited by pain and muscle length. Hamstring length was assessed by the 90/90 test with limitations by pain to 45° on the left and 50° on the right. Balance was assessed using single leg stance time (Table 2). Functionally, the patient reported being able to walk 15 minutes prior to the onset of fatigue. She continued to ambulate with limited toe push-off in gait, which was not surprising given the muscle grade of her gastrocnemius complex.

At this first reassessment, the patient's activity tolerance and strength had increased, and her back pain decreased. The plan of care was modified to incorporate weight-bearing closed chain and balance activities to continue to enhance her strength and stability in a functional manner. Exercises included bridging, quadruped and modified plantargrade alternate arm and leg raises, standing hip extension, abduction and flexion with bilateral upper extremity support. Standing balance activities were added using the parallel bars and included tandem walking, single leg stance, and unilateral standing hip exercises. The treadmill was used for aerobic conditioning with the patient initially able to tolerate 2 minutes 20 seconds at 0% incline and speed of 1.5 mph. At the time of the reassessment, the patient had progressed to 5 minutes at the same speed and degree of incline.

November 23, 2005. Following another 4 weeks, a second reassessment was performed. Subjectively, the patient denied back pain. She reported being able to ambulate 20 minutes prior to the onset of fatigue, and she reported an increase in sensation on the plantar surfaces of her feet, bilaterally.

Objectively, lumbar ROM was within normal limits without pain. Neurologically, bilateral patellar and achilles reflexes were intact, but she continued to have diminished light touch sensation on the plantar surface of both feet. Muscle performance was assessed and showed continued slight gains in strength (see Table 1). On special tests, hamstring length via 90/90 test improved to 52° on the left and 57° on the right. Quadriceps length assessed with the Ely test was

positive 3 inches on the right and 1 inch on the left. Balance assessment using single leg stance time showed an increase in stance time bilaterally (Table 2). Functionally, the patient continued to present with a decrease in toe push-off gait pattern bilaterally.

At this point, the patient's visits were reduced to one time per week in preparation for discharge from outpatient PT. The plan of care was to continue to reduce gait dysfunction, maximize endurance, and ensure independence with a home exercise program using the patient's own equipment that she had at home. The patient purchased exercise bands, a theraball, and a treadmill which she used to walk 20 minutes each day. Lumbar stabilization exercises continued with seated exercises on a theraball and included hip rocking, marching, and alternating knee extension. Heel raises in modified plantargrade was used to strengthen the gastrocnemius complex to assist with gait. Standing hip extension and abduction using resistance with theraband provided strengthening in addition to balance. Aerobic conditioning using the treadmill continued to be enforced and was used as warm-up prior to exercises. Gait training with mirrors for visual feedback in addition to verbal cuing and demonstration was used to reduce the patient's gait dysfunction.

December 29, 2005. Upon final assessment and discharge, the patient continued to deny back pain. Her only complaint at discharge was a recent onset of fatigue attributed to hyperglycemia as a side-effect

from her medication.

Lumbar ROM was within normal limits without pain, patellar and achilles reflexes were intact bilaterally, but she continued to present with decreased light touch sensation to the plantar surface of the left foot. Muscle performance was assessed and a gradual gain in strength was noted (Table 1). The patient had a negative Ely test on the left and positive by one inch on the right. Hamstring length using the 90/90 test was limited to 62° on the right and 55° on the left. The patient's gait was not antalgic but she still presented with gait deviations of decreased cadence and mild trendelenburg gait bilaterally with a slight decrease in toe push-off bilaterally.

The patient was independent with a home exercise program incorporating balance, lumbar stabilization, strengthening, stretching, and aerobic conditioning as described above. She was discharged from PT at this time.

DISCUSSION

It is understandable there is no literature on the PT management of patients with leptomeningeal carcinomatosis given its low rate of occurrence and poor prognosis. As a complication of malignant disease, 5% of cancers will spread to the leptomeninges.¹ The prognosis for a patient with leptomeningeal carcinomatosis is poor; with no treatment, mean survival time is 4 to 6 weeks, 8 weeks with radiotherapy, and 16 weeks with radiotherapy and intrathecal chemo-

therapy.⁵ Given these statistics, it may be rare to encounter a patient with this medical history in the outpatient PT setting. The literature does include guidelines regarding use of PT intervention for patients status post bone marrow transplant (BMT).⁶⁻⁸ Patients undergoing BMT for a hematologic disease have a decrease in strength following treatment, but those that undergo an exercise program following BMT recover their pre-transplant muscle strength.⁸ Lower extremity muscle stretching, manually resisted muscle strengthening, active exercises as well as aerobic exercises are types of appropriate interventions for patients recovering from bone marrow transplants.⁷ Literature also supports the use of a treadmill aerobic exercise program for patients following BMT with benefits including increased training speed, distance able to walk, decreased heart rate, and lactate levels.⁶

While PT management of the patient with leptomeningeal involvement is lacking, the above guidelines for the patients status post bone marrow transplant may be appropriate as a general guideline for the patient discussed in this case. The patient had the same impairments that patients following BMT present with; hence, it was appropriate to base her PT on the above guidelines. However, management must take into account additional precautions given the location of leptomeningeal spread and the clinical and physiological effects of the infiltrated areas such the brain and spinal cord which may present as focal neurologic signs.

Table 2. Physical Therapy Plan of Care and Rationale

Intervention	Rationale/Example
Patient education	Avoidance of prolonged postures and exercises that increase back pain to prevent further neural irritation
Therapeutic exercise for lumbo-sacral stabilization	To reduce neural irritation and provide proximal stability to reduce pain
Gentle stretching	To shortened muscles to correct muscle imbalance while taking into account neural tension limiting muscle length by stretching in a pain-free range of motion
Therapeutic exercise for muscle strengthening	To maximize muscle performance of weak muscles
Balance training	To increase proprioception and enhance dynamic balance for ambulation
Gait training	To reduce gait deviations and assist in normalizing the patient's gait pattern
Manual lumbar traction	To alleviate pressure on nerve roots for temporary comfort of radicular pain
Aerobic exercises	For cardiovascular endurance training and to address fatigue

Table 3. Balance Assessment Using Single Leg Stance Time

	September 16, 2006		October 14, 2005		November 23, 2005		December 29, 2005	
	L	R	L	R	L	R	L	R
Time (seconds)	NT	NT	3	3	15	15	5	17

Key: NT – not tested.

CONCLUSION

The patient in this case report had a successful outcome, against odds of expected prognosis for AML complicated by leptomeningeal carcinomatosis. While resolution of her neurologic symptoms was largely attributed to the medical management of her disease, physical therapy interventions were effective in improving her impairments and functional deficits. Since the patient's pain was due to nerve root irritation, patient education was incorporated into treatment sessions for the reduction of activities and postures that exacerbate neural irritation and inflammation. Strengthening, aerobic conditioning, balance, and gait training provided this patient with better endurance, strength, tolerance for activity, ability to walk, and therefore increased independence. Lumbar stabilization exercises provided the patient with lumbosacral stability to assist with protection against spinal nerve root irritation. Further descriptions and inquiry regarding the outcomes of patients diagnosed with leptomeningeal carcinomatosis are needed to develop the optimal rehabilitation course for these patients.

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Outcomes Following the Use of Manual Therapy and Lumbar Stabilization for a Patient with Low Back Pain: A Case Report

Megan Hughes, SPT

ABSTRACT

Background and Purpose: Recent research has suggested that a combination of manual therapy and lumbar stabilization exercises may be more beneficial in treating patients with low back pain than either method alone. The purpose of this case study is to describe outcomes from a combination of manual techniques and dynamic lumbar stabilization exercises for a patient with chronic low back pain worsened by a work-related acute exacerbation. **Case Description:** A 37-year-old female presented with low back pain affecting her ability to perform functional activities. Scores on the SF-36 and Oswestry indicated initial disability, and her active trunk ROM was limited. The patient was seen for 6 visits over 5 weeks. Treatment consisted of manual therapy based on findings from the examination followed by lumbar stabilization exercises. **Outcomes:** The patient's scores on the numeric rating scale for pain and the ODQ showed clinically significant improvements. **Discussion:** The combination of manual therapy and lumbar stabilization exercises may be beneficial in treating patients with low back pain. However further research is needed to determine long-term effects and if initial pain severity affects outcomes.

Key Words: lumbar stabilization, manual therapy, low back pain

INTRODUCTION

At some point in their lives approximately 80% of the population will experience an episode of low back pain (LBP).¹ The majority of these cases will resolve within 6 weeks without any intervention.² Patients whose cases do not resolve and last longer than 3 months are generally categorized as having chronic low back pain. In the United States, it is estimated that work-related cases of low back pain that develop into chronic low back pain comprise only 10% of total cases, but make up 80% of total low

back pain related costs.³ Therefore treating chronic low back pain as well as preventing acute exacerbations from becoming chronic are of significant importance.

Two of the most frequently used methods of treating low back pain are dynamic lumbar stabilization exercises and manual therapy.⁴ Lumbar stabilization exercises generally involve teaching the patient co-contraction of the abdominal and lower back muscles to improve stability and control of the lumbar spine.⁴ Studies have shown that patients with LBP have weaker back muscles than their asymptomatic peers, suggesting that strength improvements in these muscles could decrease the occurrence of LBP.⁵ Lumbar stabilization exercises can also be thought of as actively involving the patient in their own rehabilitation process, which is an important component of successful treatment strategies for chronic pain. Manual therapy in contrast, requires the skills of a trained physical therapist to stretch or manipulate the patient's joints with the aim of improving their joint mobility and thus reducing pain.⁶

Many studies have looked at the effectiveness of the two previously mentioned treatments individually and in comparison with each other. Each treatment has been shown to have success on its own, or when compared with traditional methods. Hides et al⁷ found specific exercise therapy to be more effective in reducing reoccurrences of low back pain than traditional medical management alone. Grunnesjo et al⁸ compared groups of low back pain patients receiving manual therapy and those receiving traditional advice to stay active and found manual therapy to be better at reducing pain and disability. Manual therapy has also been shown to have immediate effects in reducing pain, regardless of whether a randomly assigned or therapist selected technique was used.⁹ Studies comparing the two treatments have had mixed results. Goldby et al⁴ examined the differences between lumbar stabilization exercises

and manual therapy and found stabilization exercises to be more effective at reducing disability 12 months after the initial intervention, but found both treatments to be better than no treatment at all. Other studies have also shown stabilization exercises to be more effective than manual treatment in reducing the reoccurrence of low back pain.¹⁰ In contrast, Aure et al¹¹ compared groups receiving either manual therapy or exercise therapy and found significantly greater improvements in the manual therapy group, although both groups showed improvements.

Fewer studies have examined the effectiveness of using both treatment methods together. However Geisser et al⁶ did find a combination of stabilization exercises and manual therapy to be more effective than either treatment individually. Considering manual therapy can provide immediate analgesic effects, it could theoretically be used to decrease a patient's pain thus allowing them to better perform stabilization exercises, which could positively affect their overall long-term outcome regarding chronic and recurrent episodes. The purpose of this case study is to describe outcomes from a combination of manual techniques and dynamic lumbar stabilizations exercises for a patient with chronic low back pain worsened by a work-related acute exacerbation.

CASE DESCRIPTION

History

Ms. T, a 37-year-old female nurse, was referred to physical therapy by occupational health services with a medical diagnosis of lumbar strain. She was involved in an accident at work where she was standing in a bent-over position, transferring a large patient back to a bed that ended up being unlocked. She immediately felt pain in her lower back that worsened over the next few days. At that point she was evaluated by occupational health services where she was referred to physical therapy. On the day of the examination, approximately one week after

her accident, Ms. T presented with pain in her lower back, worse on the left side, which would sometimes radiate down into her right hip and thigh or up into her upper back and neck. Before this incident she described having intermittent right hip and back pain from 2 previous accidents where she fell and landed on her right side. For these injuries she sought chiropractic treatment with ultrasound which provided some relief. Since her recent accident she had been following her doctor's advice of alternating 20 minutes use of heat and ice several times a day, which she said would decrease her pain level for short periods of time. She was also prescribed Skelexin, a muscle relaxer, and was taking Tylenol for pain. On the day of examination she described her pain as dull, aching, and constant, with an occasional feeling of 'pins and needles' in her lower back. As a result of her accident she also described being unable to transfer patients at work, pick up her children, do her regular exercise routine, or do laundry without experiencing increased pain. Her goals for therapy were to be able to perform these activities without increasing her pain level, and to decrease her overall level of pain.

Examination

The numeric rating scale for pain asks patients to rate their pain on a scale of 0-10, with 0 representing no pain at all, and 10 representing the worst possible pain. Using this scale we asked Ms. T to report her current pain level at that time and the best and worst pain levels she had experienced in the past few days. Ms. T reported her current pain to be a 4, her worst to be an 8, and her best to be a 1. Palpation of the patient's back revealed tenderness over the left lumbar paraspinals. We assessed the mobility of Ms. T's joints by manually applying posterior-to-anterior glides to the thoracic and lumbar spinous processes. The patient reported at least some pain at all lower thoracic and lumbar levels. With Ms. T in standing, we also palpated her bilateral ASIS, PSIS, and iliac crests, looking for differences in height. Her right PSIS appeared to be higher than the left, and her right ASIS appeared to be lower than the left. Ms. T also experienced pain with standing forward bending and side bending to the right when active ROM of the lumbar and thoracic spine were tested. All other directions were pain-free and appeared to have normal end ranges of motion, including side bending to the left, bending

backwards, and rotating to both the left and right. We measured her lumbar forward flexion ROM using a double inclinometer method. Palpation was used to locate and center an inclinometer over the patient's S1 and T12 vertebrae. The patient was then asked to bend forward as far as possible before experiencing pain. The total excursion in degrees for the S1 inclinometer was then subtracted from the total excursion of the T12 inclinometer and was found to be 16°. Lumbar ROM has been shown to have a weak correlation with overall disability in patients with low back pain.¹² However because the patient was unable to obtain full lumbar flexion ROM due to increased pain, we used this measure as a way to document improved pain-free lumbar ROM. In looking at Ms. T's neurological functioning, we tested her patellar and Achilles reflexes and found them to be intact and equal bilaterally. By lightly touching the dermatomal patterns of her lower extremities, we also checked sensation and found it to be equal bilaterally with no abnormalities. Bilateral lower extremity ROM and manual muscle testing (MMT) were also performed, as it is our opinion that deficits from the lower extremities can affect the lower back. Manual muscle testing of hip flexion, abduction, and extension as well as knee flexion and extension found mild strength deficits (3+/5) in bilateral hip flexion and left hip extension. All other tests were graded at a 4/5 or better and equal bilaterally. The following tests were used to look at Ms. T's flexibility: 90-90 straight leg raising, Ober's, Ely's, and Thomas. All of these tests produced positive results bilaterally, indicating moderate tightness in Ms. T's hamstrings, iliotibial bands, quadriceps, and hip flexors.

The SF-36 (36-Item Short Form Health Survey Instrument) and the Oswestry Low Back Pain Disability Questionnaire (ODQ) were administered on the first, fourth, and last visits. The SF-36 uses different categories to determine the extent to which a patient is limited in their daily life, with a score of 0 representing severe limitations and a score of 100 representing no limitations. On the initial visit, Ms. T scored a 50 on physical functioning, a 25 on role limitations due to physical health, a 35 on pain, and a 50 on general health. The SF-36 has been shown to have moderate to high reliability (ICC = 0.65 to 0.94) and good item discriminant validity (r = 0.92).¹³ The ODQ is designed to measure percentage of disability

as a result of low back pain, with a score of 0 representing no disability, and a score of 100 representing the greatest possible disability. On the day of the examination, Ms. T scored a 28, indicating a disability level of 28%. The Oswestry has been shown to have high test-retest reliability (0.99) and moderate construct validity (r=0.62) when correlated with the visual analog scale.¹⁴

Evaluation Diagnosis

Based on the findings from the examination, Ms. T was not expected to have neurological involvement since neurological screening tests were negative. Although she presented with minor lower extremity strength and flexibility deficits, these were not expected to be the primary source of her pain as they were equal or similar bilaterally and were at levels one might expect for a female of Ms. T's age. Based on previous experience with similar patients along with the findings collected from the examination, Ms. T was found to have an acute lumbar strain, placing her in the impaired joint mobility, motor function, muscle performance, range of motion associated with localized inflammation preferred practice pattern from the *Guide to Physical Therapist Practice*. This condition was likely made worse by having a previous history of lower back and hip pain.

Prognosis

Most cases of acute low back pain are predicted to resolve in approximately 6 weeks.¹⁵ However studies indicate that having had previous episodes of low back pain can negatively impact recovery.¹⁶ Based on previous clinical experience with similar patients, it was expected that Ms. T would require 4 to 6 weeks of treatment with 2 to 3 treatments per week in order to present with unrestricted lumbar ROM and to achieve her goals of decreasing her overall pain level and performing daily activities without increasing her pain.

Intervention

Ms. T was seen for 6 visits over a 5 week span. Interventions included manual therapy, use of a cold pack, stretching exercises, and dynamic lumbar stabilization exercises which are shown in Table 1. Immediately after the initial evaluation, manual therapy was performed based on the results of the examination. The patient was placed on a plinth on her right side, with her left knee

Table 1. Stabilization Exercises Performed by Treatment Session

	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6
Straight leg raise with BP cuff	15 reps bilaterally (B)	20 reps B	30 reps B	30 reps with abduction B	30 reps with abduction B
Bridging	25 reps	30 reps	30 reps with marching	30 reps with kicks	30 reps with kicks and 1 lb weights
Quadruped leg extension with roll	10 reps B	15 reps B	20 reps B	30 reps B	30 reps B
Box lifts		2 sets of 10 0 lbs	3 sets of 10 0 lbs	2 sets of 10 10 lbs	3 sets of 10 10 lbs

and hip flexed. Standing facing the patient, the therapist's fingers were interlocked with the left palm over the patient's left ASIS and iliac crest and the right palm over the posterior aspect of the patient's iliac crest. The therapist's forearms were used to stabilize, with the left forearm running along the patient's anterior thigh and the right forearm over the patient's ischial tuberosity. In this position, the therapist attempted to 'rock' Ms. T's left hemipelvis into an anterior tilt while minimizing movement at the left hip joint (Figures 1 and 2). Three sets of 10 repetitions were performed. Muscle energy techniques (METs) were performed with the patient in hook-lying and the therapist kneeling by the patient's feet, the patient's right ankle was placed over the therapist's left shoulder and the patient's left knee and hip were flexed with the therapist's hands around their left thigh just above the knee. The patient was then instructed to push her right leg down into the therapist's shoulder and to pull her left leg towards her, against the resistance of the therapist's hands. Ms. T performed 2 sets of 5 repetitions, holding each rep for 5 seconds and resting 5 seconds in between reps. Following the mobilizations and METs, the patient reported a slight reduction in pain. Re-testing of her active ROM of the thoracic and lumbar spine also revealed a greater pain-free range into right side-bending. At the beginning of each subsequent visit, Ms. T's pain level was assessed, as was the active ROM of her thoracic and lumbar spine. On visits 2, 3, 4, and 5 she presented with pain in her lower back and pain in at least one of the active ROM directions described in the examination. Based on previous success with pain reduction, mobilizations and METs were performed on visits 2 through 5 and similar results in pain reduction were achieved. In order to determine the directions in which to perform the manual techniques, we also reassessed Ms.

T's ASIS, PSIS, and iliac crest heights near the start of each visit.

Beginning on the second visit, Ms. T was taught a stretching program to improve upon the lower extremity ROM deficits found in the initial evaluation. For her hamstrings she was taught a single-leg long sitting stretch. In a supine position she performed a stretch for her iliotibial band by using a rope to pull her leg across her body. She performed a stretch for her quadriceps in a side-lying position, and for her hip flexors she was instructed in a lunging stretch. Based on previous clinical experience with similar patients, we also had Ms. T perform a stretch for her piriformis in supine that involved pulling her knee toward her opposite shoulder. Finally, Ms. T was shown a prayer stretch to target the musculature of her lower back. She began in a quadruped position, walked her hands forward and to the right, and then rocked back on her heels to feel the stretch along the left side of her back. This stretch was repeated for the right side as well. All stretches were held once for one minute. As a home exercise program (HEP), we gave Ms. T printouts of the stretches and instructions to perform each one twice daily in order to improve her flexibility.

As a final component of Ms. T's treatment, she was instructed in lumbar stabilization exercises designed to activate the muscles that support the lower back and spine. Before beginning the exercises, Ms. T was instructed on the concept of 'pelvic neutral' briefly defined as the midpoint between a full anterior pelvic tilt and a full posterior pelvic tilt which is usually associated with a reduction in pain. When she demonstrated the ability to find and maintain pelvic neutral, she was then instructed in 3 exercises: single leg extension with blood pressure cuff (SLE with BP cuff), bridging, and quadruped leg extension with roll. For the SLE with BP cuff the patient began in a hooklying posi-

tion and was asked to maintain pelvic neutral while extending one leg, lowering it to mat, and then bringing it back to its original position. She would then complete the task with the other leg. To provide her with visual feedback, a partially inflated blood pressure cuff was placed under Ms. T's lower back. If she did not maintain pelvic neutral by either arching or flattening her back too much, the needle of the blood pressure cuff would move up or down. On subsequent visits Ms. T's form improved with the exercise, and she was able to complete more repetitions without compromising form. On visit 5, the exercise was progressed to a higher degree of difficulty by adding an abduction component that required a greater degree of stabili-



Figure 1. Start position for manual rocking technique.



Figure 2. End position for manual rocking technique.

zation. She was asked to abduct her leg from midline after extending it, and then return it to midline before lowering it. The second exercise that we taught Ms. T was bridging. She began again in hooklying, and was then asked to maintain pelvic neutral while raising her buttocks off the mat. Initially she reported some pain in her lower back with this exercise, so she was then instructed to go into a greater posterior pelvic tilt which eased her symptoms. This exercise was first progressed in repetitions, and by the fourth visit, it was progressed in difficulty by asking her to pick up her feet, one after the other, after bridging up. The marches were progressed to full kicks, which were then progressed by adding a 1 lb weight to each of her ankles. The third exercise involved Ms. T in a quadruped position, extending her legs behind her, one at a time, while maintaining pelvic neutral. As a means of providing feedback, a cylindrical styrofoam roll was placed across her lower back. If she did not stabilize her lower back by maintaining pelvic neutral, the roll would wobble up and down each time she extended her leg. This exercise proved to be the most difficult for Ms. T to maintain correct form, likely because it offers the least amount of contact surface from which to stabilize on (patient's hands and one knee). Therefore it was only progressed in repetitions, not in further difficulty. On Ms. T's third visit, we introduced her final exercise, box lifts. These were included to mimic situations she might encounter in real life. By practicing a correct

lifting technique, she would learn to correctly stabilize when lifting heavy objects. She was taught to maintain a slight curve in her lower back when bending down and picking up a wooden box. As she was able to maintain correct form with increased repetitions, weight was then added to the box to increase difficulty. On visits 2 through 5 a cold pack was used to decrease any pain following the exercises.

OUTCOMES

Lumbar flexion ROM, scores on the ODQ, the SF-36, and current, best, and worst pain intensity levels were recorded on visits 1, 4, and 6 (Table 2). Independent of baseline pain severity, the minimum decrease associated with a meaningful change in patient status for the NRS for acute pain has been shown to be 20%.¹⁷ Ms. T reported a 75% decrease in current pain level (from 4 to 1) and a 37.5% decrease in worst pain level (from 8 to 5) between visits 1 and 4. Additionally she reported a 100% decrease in current and best pain levels (a 0 for both final scores) between visits 1 and 6. Her worst pain level also decreased 87.5% (from 8 to 1) between the first and last visits. Based on the previously cited study, all of these changes in pain intensity appear to be meaningful. Ms. T's lumbar flexion ROM was measured on visits 4 and 6 using the same technique described in the examination. Between her first and last visits, Ms. T's lumbar ROM improved from 16° to 38°. Studies have shown

high intrarater reliability ($r = 0.96-0.99$) for this method in patients with limited ROM,¹⁸ suggesting that measurer error alone would not produce large changes in lumbar ROM. Rondinelli et al¹⁹ estimated the median range of error for the double inclinometer technique to be 10.5°. Based on this estimate, Ms. T's overall improvement of 22° would have exceeded measurement error. However, a review of the literature found no specific value for a clinically significant change in lumbar flexion ROM, most likely because this measure is poorly correlated with functional outcomes.¹² For the Oswestry disability questionnaire, the minimum clinically important difference has been shown to be 6 points.¹⁴ Ms. T's scores changed from a 28 to an 18 (10 points) and from an 18 to an 8 (10 points), suggesting that individual between-survey changes as well as her overall decrease of 20 points from the beginning of treatment to the end of treatment are all considered to be clinically significant. Ms. T's scores improved on all 4 categories of the SF-36. Her physical functioning score improved from 50 to 85, her role limitations due to physical health improved from 25 to 75, her pain improved from 35 to 57.5, and her general health improved from 50 to 66.7. The SF-36 has been reported to have a population standard deviation of 10.0,¹³ suggesting that the observed large differences in scores would not be reported by chance alone. However, no MCID has been established and so the clinical meaningful-

Table 2. Outcome Measures

	Visit 1	Visit 4	Visit 6
Current pain level	4	1*	0*
Best pain level	1	1	0*
Worst pain level	8	5*	1*
Lumbar flexion ROM	16°	28°	38°
Oswestry	28	18*	8*
SF-36 Physical functioning	50	85	85
SF-36 Role limitations due to physical health	25	75	75
SF-36 Pain	35	35	57.5
SF-36 General health	50	62.5	66.7

* Based on previous research, these values represent a clinically meaningful change.

ness of these changes cannot be explicitly determined. Finally, Ms. T described several daily activities that increased her pain level, including normal work duties, picking up her children, routine exercise, and laundry. On her last visit, Ms. T reported being able to return to these activities without any increases in pain.

DISCUSSION

The purpose of this case report was to describe outcomes for a patient with low back pain treated with both manual techniques and dynamic lumbar stabilizations exercises. Previous research¹ has suggested that a combination of manual therapy and specific adjuvant exercises is beneficial in treating low back pain. Ms. T was seen over the course of 5 weeks for 6 treatments, with 4 of these treatments consisting of manual therapy followed by stabilization exercises. At the beginning of each treatment, Ms. T's pain level was evaluated and manual therapy was performed with the goal of decreasing her pain level before asking her to perform stabilization exercises. By the last treatment, Ms. T no longer reported initial pain, and instead her treatment consisted of exercises only. The manual techniques we used on our patient differed slightly from those by Geisser et al.⁶ While we included METs as they did, we also used mobilizations based on the clinical instructor's previous successes with these techniques. Although our manual approaches differed somewhat, other research⁹ has shown that specific manual techniques are not as important in achieving reductions in pain as simply performing manual therapy. The exercises we prescribed for our patient involved the same dynamic lumbar stabilization principles as those by Geisser et al.,⁶ but were chosen specifically based on previous clinical experience. According to the outcome measures, Ms. T experienced significant decreases in both pain and disability, and was also able to resume daily activities that previously caused her increased pain. While the specific effects of each treatment method cannot be determined, it is our belief that Ms. T may have experienced psychological benefits from an immediate pain reduction following manual therapy that contributed to her overall improvement. Based on previous research and the meaningful changes seen in Ms. T, we would recommend a combination of manual therapy and stabilization exercises as a treat-

ment method for similar patients experiencing low back pain.

The research of Geisser and colleagues⁶ involved randomizing patients with chronic low back pain into one of four groups receiving either specific or nonspecific exercises and manual or sham manual therapy. The groups were similar at the start of the study, and the therapists attempted to treat patients from each group for equal amounts of time. Although patients were blinded to the treatment they were receiving, the therapists were not. At the end of the study, patients were analyzed in the groups they were initially assigned to, and the group receiving specific exercises and manual therapy had the greatest gains in pain relief. One limitation of this study was that the researchers did not follow-up with the patients beyond the end of their treatment, so we are unable to know the long-term effects and whether patients maintained their level of pain relief. The authors cite another limitation as being the fact that patients who dropped out of the study were more likely to present with higher levels of pain and disability, suggesting the intervention may not be as effective for patients falling into this category.

Further research is needed to determine the effectiveness of using manual therapy and stabilization exercises as a combined treatment for patients with low back pain. Future studies should examine the long-term outcomes of the treatment method as well as its effects on specific categories of patients with low back pain, such as those with a higher initial pain level. Finally, further research investigating the effects of specific manual techniques, such as mobilizations or manipulations, and specific stabilization exercises could help determine the best treatment option for patients with low back pain. The author proposes a study grouping patients with a chief complaint of 'low back pain' based on their initial scores on the Oswestry into mild, moderate, or severe disability categories. Patients would then be randomly placed into one of 6 treatment groups, receiving mobilizations, manipulations, or sham manual therapy and either dynamic lumbar stabilization exercises or general exercises. At the end of an 8-week treatment plan, the groups would then be analyzed to determine the effectiveness of each method and whether initial pain and disability had effects on outcomes. The Oswestry disability questionnaire and the nu-

meric rating scale for pain would be used as outcome measures and patients would receive monthly follow-ups for one year to determine long-term effects.

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Ultrasound Treatment may not be a Contraindication for Joint Arthroplasty

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ABSTRACT

Introduction: Ultrasound (US) is a highly used clinical modality for a variety of pathologies. Historically there have been several contraindications for the use of US but there is a paucity of evidence regarding the use of US in the area of a joint arthroplasty. The purpose of this study was to examine the effects of therapeutic US on the methyl methacrylate (MMA) used to secure the prosthesis of a hip arthroplasty in a pig.

Procedure: A hip prosthesis was sized and surgically implanted in a freshly slaughtered pig. The pig underwent a 16-slice baseline CT-scan after the surgical procedure. Forty US treatments were rendered over the lateral aspect of the hip with an Omni-Sound® 5-cm² transducer at a 1-MHz frequency at 1.5 W/cm² using overlapping circles in a 3-ERA area for 10 minutes. Two indwelling thermistors were used to monitor tissue temperature. After each set of 10 US treatments, a repeat CT scan was performed.

Results: Three orthopedic surgeons were blinded to the sequence of the CT-scans. They analyzed the scans in the anterior-posterior, lateral, and axial views for interface widening by Gruen zones. There was 100% agreement that there was no evidence of MMA fragmentation. All radiolucent zones were less than 1 mm in width and there was no significant difference in the interface width between the CT scans ($p = 0.21, 0.42, 0.57$). **Conclusions:** Based on the results of this study, it does not appear that US had a deleterious effect on the MMA used to secure the hip prosthesis. Although the parameters used were within therapeutic range and mild tissue heating was achieved, the number of treatments was extreme. This was a conscious decision to be assured that if deleterious effects were to occur, the parameters used would provoke them. Despite this being a single-subject design, the researchers believe this methodology is a reasonable approach to begin to make clinical decisions

about US and arthroplasties. Of course, clinicians should exercise caution when rendering US in the area of an arthroplasty, however, it appears reasonable to use this modality for soft tissue heating and healing in the general area of an arthroplasty.

Key Words: ultrasound contraindications, orthopedic implants, methyl methacrylate

INTRODUCTION

Ultrasound (US) is a high frequency waveform used for therapeutic purposes. Ultrasound is a widely used therapeutic modality in physical therapy with both thermal and mechanical effects.¹⁻⁴ Thermal effects help to increase blood flow, tissue metabolism, enzymatic activity, and oxygen uptake.^{1,2} Whereas, mechanical effects include increased cell membrane permeability, histamine release, macrophage and fibroblast activity, intracellular calcium, and protein synthesis.^{3,4} All of these processes are essential to tissue healing. Hence, US is appropriate for the treatment of soft tissue pathology such as muscle strains, ligament sprains, tendonitis, and bursitis, to name a few. However, there are some contraindications to the use of US. Contraindications such as the presence of a cardiac pacemaker, lack of sensation, and malignant growths have documented deleterious effects.⁵⁻⁷ But, other contraindications for US have been perpetuated in the literature for many decades because of the challenges of investigating them. One such contraindication involves the use of US in the area of a joint arthroplasty. This is a situation that has created challenges to study because of the ethical issue of placing a person at risk for unknown consequences. The fear of using US on joint replacements has been out of concern for the potential compromise to the integrity of the material used to cement the prosthesis in place. The purpose of this study is to examine the effects of 1-MHz

US on the joint replacement cement (methyl methacrylate) to secure a hip replacement in a pig.

PROCEDURE

A self-centering universal hip prosthesis (DePuy Inc, Warsaw, Ind) was sized (39 mm OD femoral metal cup; 28 mm ID poly insert) and surgically implanted via a posterior approach by a licensed orthopedic surgeon (JJN) into a freshly slaughtered pig (Kolb Brother's Butcher, Spring City, Pa). Methyl methacrylate (MMA) was used to cement the prosthesis in place. Two, 4-cm, 29-gauge thermistors (Physiotemp Instruments Inc, Clifton, NJ) were inserted into the soft tissue of the surgical hip to monitor temperature changes throughout the US treatment. Both thermistors were placed in the path of the propagated US beam. One thermistor was superficial to the shaft of the prosthesis at a depth of 1.5 cm and one was adjacent to the shaft of the prosthesis at a depth of 2.5 cm. A baseline 16-slice CT-scan was performed to identify the presence of radiolucent zones.

Forty consecutive US treatments were rendered with an OmniSound (Accelerated Care Plus, Topeka, Kan) 5-cm² transducer (4.9-cm² effective radiating area) at a 1-MHz frequency to target deeper tissue.⁸⁻¹⁰ An intensity of 1.5 w/cm² was delivered using overlapping circles in an area that was three times the transducer effective radiating area. The beam non-uniformity ratio identified by the manufacturer was 2:1. The transducer was moved at a rate of 3-4 cm/sec. Each treatment was 10 minutes in duration over the lateral aspect of the hip. The parameters implemented were based on previous research^{8,11,12} and clinical experiences. All treatments were performed by the same licensed physical therapist (DTG). Tissue temperature was recorded via both thermistors every 30 seconds for the duration of

each US treatment. Tissue temperature was allowed to return to baseline between US treatments. After each set of 10 US treatments, a repeat 16-slice CT scan was immediately performed. Data collection was a continuous process with the time from slaughter to completion of all 40 US treatments being 35 hours.

RESULTS

Three orthopaedic surgeons were blinded to the sequence of the CT scans. They analyzed the scans in the anterior-posterior, lateral, and axial views for interface widening by Gruen's Zones (Figure 1 and 2).¹³⁻¹⁶ There was 100% agreement that there was no evidence of MMA fragmentation. All radiolucent zones were less than 1 mm in width and an analysis of variance revealed that there was no significant difference in the interface width between the CT scans ($p = 0.21, 0.42, 0.57$) for each surgeon. Tissue temperature increased an average of 1° C per treatment at each thermistor site.

CONCLUSIONS

As previously stated, therapeutic US (1 and 3 MHz) is used for both thermal and mechanical effects on soft tissue. Lower frequency US (46.5 kHz) has been used to remove plaque in dentistry, cataracts in ophthalmology, and cement securing orthopaedic implants.¹⁷⁻¹⁹ Thus, there is concern about potential damage to the integrity of a prosthetic implant when using a therapeutic frequency. Batavia²⁰ conducted a literature review to explore the agreement of contraindications for ultrasound cited in clinical practice. The sources identified from 9 to 36 contraindications across 85 conditions. Although arthroplasty was one of the many contraindications identified, the sources ranged from 20% to 95% agreement across the various pathologies. Unfortunately, numerous sources did not cite a reference for their stated contraindications. It appears that many of the contraindications identified were simply perpetuated over time without a basis of scientific support. For many of the conditions identified, it would be unethical to subject an individual to the potential risks associated with the administration of ultrasound, ie, pregnancy, growth plates, and orthopaedic appliances. Thus, no research has been published for many of the conditions.

Based on the results of this study, it does not appear that US had a deleterious effect on the MMA used to secure the hip prosthesis.

Although the parameters used were within therapeutic range and mild tissue heating was achieved at the depth of the prosthesis, the number of treatments was extreme. This was a conscious decision to be assured that if deleterious effects were to occur, the parameters used would provoke them. Despite this being a single-subject/swine design, the researchers believe this methodology is a reasonable approach to begin to make clinical decisions about the effects of US on arthroplasties. Although there is no therapeutic rationale for the direct application of US to a prosthetic implant, there are benefits to treating the surrounding soft tissue. Range of motion limitations resulting from musculature tension or shortening has been reported to respond well to thermal effects.²¹⁻²⁵ Of course, clinicians should always exercise caution when rendering US to avoid extreme heating ($> 4^{\circ} \text{C}$). However, it appears reasonable to use this modality for soft tissue heating and healing in the general area of an arthroplasty without causing harm to the implant. Future research could be directed at delivering the US at higher intensities and/or using US units with higher beam non-uniformity ratios (BNR) to challenge the magnitude of tissue heating.²⁶ The increase in intensity and BNR may enhance both the thermal and mechanical effects to the underlying tissue.

ACKNOWLEDGEMENTS

The researchers would like to acknowl-

edge the contributions of a few individuals, without whom this research project would not have been possible. Ms. Trudy Mazzone, MS, BSRT(R), Administrative Director of the Taylor Hospital Diagnostic Imaging Dept. and her staff; Lois Clements, Terry Fagan, Lisa Keenan, and Laurie Dengler graciously provided the CT-scans of this unusual 'patient.' The donation of the prosthetic components and the surgical assistance of Mr. Chris Sinclair (DePuy, Inc) went above and beyond the call of duty. Finally, this study was financially supported by a Widener University Provost Grant so we extend our thanks to Dr. Jo Allen (Provost) and the University Grants Committee.

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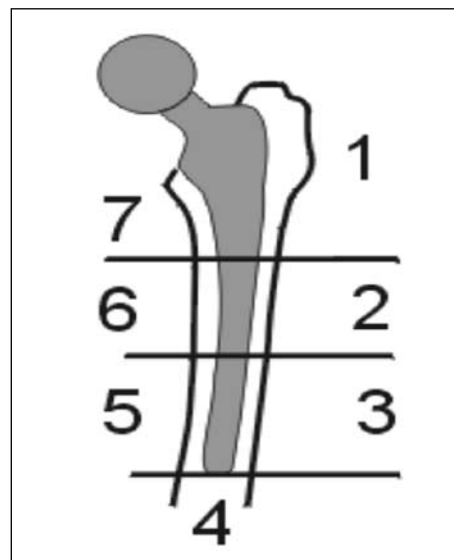


Figure 1. Gruen's Zones for the femoral component of a hip arthroplasty.¹³ Reprinted with permission from gentili.net. © Amilcare Gentili, MD.

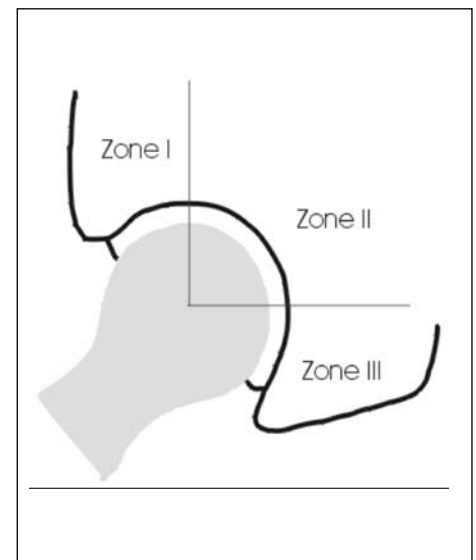


Figure 2. Gruen's Zones for the acetabular component of a hip arthroplasty.¹³ Reprinted with permission from gentili.net. © Amilcare Gentili, MD.

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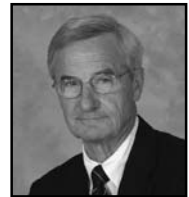


Outstanding Peer Reviewed Journal Award

Our *Journal of Orthopaedic and Sports Physical Therapy* (JOSPT) received the Outstanding Peer Reviewed Journal award at Annual Conference this past June. In the photo APTA President, Ben Massey presented the award to Mike Cibulka, Orthopaedic Section President, who accepted the component award.

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Use of the International Classification of Functioning and Disability to Develop Evidence-based Practice Guidelines for Treatment of Common Musculoskeletal Conditions

James J. Irrgang, PT, PhD, ATC
Joseph Godges, DPT, MA, OCS

Earlier this year, the Orthopaedic Section began a project to use the International Classification of Functioning and Disability (ICF) to develop evidence-based practice guidelines that will enhance diagnosis, intervention, prognosis, and assessment of outcomes for a variety of musculoskeletal conditions commonly managed by physical therapists. The ICF is a new model of disablement that was developed by the World Health Organization in 2001. In the ICF model, functioning and disability are classified in terms of body structure and function as well as in terms of activity and participation of the individual. The ICF model will be used to classify common musculoskeletal conditions, such as adhesive capsulitis, acute low back pain, patellofemoral pain and ankle sprains, in terms of impairment of body structure and function, activity limitations, and participation restrictions. These ICF classifications will be used to develop evidence-based guidelines for diagnosis, intervention, prognosis, and assessment of outcome. It is believed that these guidelines will advance orthopaedic physical therapist practice and could be used to guide professional and postprofessional education and to establish an agenda for future clinical research.

To begin this process, workgroups were established for 7 body regions including the:

- Foot and ankle
- Knee
- Hip
- Lumbosacral spine
- Cervicothoracic spine
- Shoulder
- Elbow, wrist, and hand

Each work group will consist of a leader and 4 to 6 members who have expertise in managing conditions involving that body region. Initially the workgroup identified 2 to

4 musculoskeletal conditions that affect the region that are commonly treated by physical therapists. For example, common musculoskeletal conditions identified by the Foot and Ankle Workgroup include plantar fasciitis and ankle sprains. The Hip Workgroup has identified the hip fractures, labral tears, osteoarthritis, and total hip replacement and the Shoulder Workgroup has identified adhesive capsulitis and impingement/rotator cuff disease as common conditions managed by physical therapists.

Next, for each condition, the workgroup will identify the impairments in body structure and function, activity limitations, and participation restrictions that are linked to the ICF classification system. For example, the impairments in body structure and function, activity limitations, and participation restrictions that can be used to classify patients with adhesive capsulitis are shown in Table 1. The impairments, activity limitations, and participation restrictions will be used to classify individuals into treatment categories and also can be used to establish prognosis and measure outcome. Measurement methods for identifying these impairments, activity limitations, and participation restrictions, including the measurement properties for each measure, will be described.

The next step will be to describe a system to classify individuals into homogeneous subsets, which will best respond to specific interventions. To accomplish this, measures of impairment, activity limitations, and participation restrictions that can be used to classify individuals into homogeneous subsets that will best respond to specific interventions will be described. References to peer-reviewed evidence to support this classification system will be provided. If no peer-reviewed evidence exists, the work-

group will use their collective clinical expertise to describe a first approximation of the classification system, which can then be the subject of further investigation. The classification system will also consider 'red flags' to identify patients that are either inappropriate for physical therapy or for whom physical therapy is appropriate but would benefit from consultation with another health care provider.

Once the classification system has been developed, the next step will be to describe interventions and the supporting evidence for specific subsets of patients based upon the classification system. The interventions will typically focus on impairments that define the specific classifications. The focus will be on interventions provided by physical therapists, however as appropriate, the guidelines will also include adjunctive procedures and/or pharmacological considerations. For example, based on existing evidence (for example, Carette et al 2003) the guidelines for management of adhesive capsulitis should address considerations for intra-articular injection of corticosteroids.

In summarizing the evidence to support specific interventions, consideration will be given to the strength of evidence. Greater emphasis will be given to clinical research involving patients. If clinical evidence is lacking, evidence to support the biomechanical or biological plausibility of the intervention will be provided. Specific recommendations for patient education will be included in the description of interventions. For post-operative conditions, modifications to the impairment based classification and treatment system based upon surgical procedure and expected time course for healing will be considered.

The final step will be to disseminate the guidelines for review and use. To facilitate

Table 1. ICF Classification of Impairments, Activity Limitations, and Participation Restrictions for Adhesive Capsulitis of the Shoulder

<p>Body Structures Related to Adhesive Capsulitis of the Shoulder</p> <ul style="list-style-type: none"> • Joints of shoulder region (s7200) • Ligaments and fasciae of shoulder region (s7204) • Muscles of shoulder region (s7203)
<p>Body Functions Related to Adhesive Capsulitis of the Shoulder</p> <ul style="list-style-type: none"> • Pain in joints (b28016) • Pain in upper limb (b28014) • Mobility of single joint (b7100) • Mobility of several joints (b7101) • Mobility of scapula (b7200) • Power of isolated muscles and muscle groups (b7300) • Endurance of isolated muscles (b7401) • Endurance of muscle groups (b7401) • Control of simple voluntary movements (b7600) • Control of complex voluntary movements (b7601) • Coordination of voluntary movements (b7602)
<p>Activity and Participation Related to Adhesive Capsulitis</p> <ul style="list-style-type: none"> • Lifting and carrying objects (d430) <ul style="list-style-type: none"> • Lifting (d4300) • Carrying in hands (d4301) • Carrying in arms (d4302) • Carrying on shoulders, hip or back (d4303) • Putting down objects (d4305) • Hand and arm use (d445) <ul style="list-style-type: none"> • Pulling (d4450) • Pushing (d4451) • Reaching (d4452) • Turning or twisting the arms or hands (d4453) • Throwing (d4454) • Catching (d4455) • Washing oneself (d510) <ul style="list-style-type: none"> • Washing body parts (d510) • Washing whole body (d511) • Drying oneself (d512) • Caring for body parts (d520) <ul style="list-style-type: none"> • Caring for hair (d5202) • Toileting • Dressing <ul style="list-style-type: none"> • Putting on clothes (d5400) • Taking off clothes (d5401) • Eating (d550) • Drinking (d560) • Doing housework (d649) • Caring for household objects (d650) • Assisting others with self-care (d660) • Acquiring, keeping and terminating a job (d845) • Remunerative employment (d850) • Community life (d910) • Recreation and leisure (d920) <ul style="list-style-type: none"> • Play (d9200) • Sports (d9201) • Crafts (d9203) • Hobbies (d9204) • Socializing (d9205)

use, flow diagrams and algorithms that summarize the classification and clinical decision making processes will be created. Tools to support use of the guidelines, including data collection forms, recommendations for evaluation of patient outcomes, and patient education materials, will be created. Manuscripts describing the evidence-based guidelines for management of common musculoskeletal conditions will be written and submitted for publication.

This project is a work in progress. A summary of the project and progress to date, including presentation of the first evidence-based guidelines for management of common conditions affecting the foot and ankle, hip and cervicothoracic spine, will be presented at the Combined Sections Meeting in Boston on February 15, 2007 from 12:30 to 2:30 PM.

For more information concerning the project, please contact Joe Godges or Jay Irrgang through the Orthopaedic Section Office at 1-800-444-3982 or via our e-mail addresses that are provided on page 4.

REFERENCE

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Dickman CA, Fehlings MG, Gokaslan ZL. Spinal Cord and Spinal Column Tumors: Principles and Practice. New York, NY: Thieme; 2006. 694 pp, illus.

According to a contributing author of this text, *Spinal Cord and Spinal Column Tumors* is the only reference that provides a comprehensive description of the contemporary diagnosis and management of tumors within the spinal column. As stated in the foreword, the intent of this book is to provide neurosurgeons and surgical trainees with an extensive description of the pathologic features of spinal tumors, classification, radiographic assessment, and surgical management of benign and malignant spinal column tumors. This text has over 75 contributing authors from various specialties in neurosurgery and radiology across North America.

This book is comprised of 44 chapters. Within each chapter, the co-authors provide many vivid, schematic representations and radiographic illustrations that supplement the content of the text. The first chapter presents an in-depth description of the anatomy of the spine and spinal cord. A detailed description is provided regarding the osseous characteristics and vascular anatomy in the different regions of the spine as well as the anatomy of the nerve roots and a review of the ascending and descending tracts within the spinal cord. The next several chapters discuss the clinical manifestations and the oncology classification of benign and malignant tumors within the vertebral column as well as tumors within the spinal cord and adjacent soft tissue in the pediatric and adult population. The pathologic features regarding the various types of tumors within the nervous system are described and are supplemented with microscopic representations depicted within the text. The authors provide an in-depth discussion of the specific cellular and genetic alterations that are associated with the development of certain types of central and peripheral nerve neoplasms. A chapter in the text reviews the various radiologic imaging techniques that assist the physician with the differential diagnosis of intradural and extradural lesions.

In addition, information is provided on the various chemotherapy agents that are used in the management and treatment of spinal lesions.

Twenty-eight chapters within this text provide a comprehensive discussion on procedural approaches to percutaneous biopsy, spinal reconstruction including resections, spinal fixations and biomechanical considerations for reconstructive spinal surgery. Each chapter contains detailed, anatomic illustrations that supplement the context of each surgical procedure. The descriptions of the surgical approaches that are performed in the cervical, thoracic, lumbar, and sacral regions are also well delineated into separate chapters within the text. Surgical procedures described include, but are not limited to, vertebral body reconstruction, diagnostic biopsy, thoracoscopic resection, percutaneous vertebroplasty, kyphoplasty, and corpectomy. Also, the text contains a chapter on a noninvasive, radiosurgical technique known as the cyberknife procedure.

Although this text is recommended for neurosurgeons and surgical trainees, the information presented in several chapters would be of interest to physical therapists. A chapter discusses the considerations for the screening and differential diagnosis would be applicable during an objective exam. The neurologic manifestations of spinal tumors are described in detail, including clinical symptoms of intramedullary and extramedullary tumors, abnormal spinal reflexes, motor and sensory signs and symptoms. Also, information is provided to assist the clinician to distinguish radicular from peripheral nerve dysfunction. Five chapters within the text contain information pertaining to the epidemiology, clinical presentation, and conventional diagnostic imaging studies of spinal tumors. Also, the perioperative and postoperative management as well as surgical complications are discussed in detail.

Due to the limited amount of information relating to the practice of physical therapy, this textbook is not recommended to serve as a primary resource to physical therapists. The author's intent is to provide comprehensive information regarding the various classification, imaging, and surgical techniques for spinal column tumors. The

information provided within the text would serve as an excellent addition in a hospital library as a reference for other health care disciplines.

Kathleen Geist, PT, OCS

Moffat M, Harris KB. Integumentary Essentials: Applying the Preferred Physical Therapy Practice Patterns. Thorofare, NJ: SLACK Inc; 2006. 133 pp, illus.

Integumentary Essentials: Applying the Preferred Physical Therapy Practice Patterns is part of a series of 4 books that is a companion to the guide to physical therapy practice. It is the goal of the authors that these *Integumentary Essentials* will provide students and clinicians with a valuable reference for physical therapy practice. The text does an excellent job of aligning itself with the guide. The contents include a color atlas including chapters on the primary prevention and risk reduction for integumentary disorders, impaired integumentary integrities associated with superficial skin involvement, partial thickness skin involvement and scar formation, full thickness skin involvement and skin involvement extending into the fascia, muscle, or bone and scar formation. The editors of this text do an excellent job on choosing experts in each one of these areas for review of the areas. The description of the text is comprehensive with an excellent understanding for the student and reference for the clinician. Like the guide to physical therapy practice, *Integumentary Essentials* is laid out in the 5 elements of patient/client management. This model includes the 5 essential elements of examination, evaluation, diagnosis, prognosis, and intervention that result in optimal outcomes. This process demonstrates to the clinician and student a dynamic process; progress the patient in a process, return to an earlier element for further analysis, or exit the patient from the process when the needs of the patient cannot be addressed by the physical therapist.

The chapters on partial and full thickness skin involvement were excellent; they includ-

ed history, system review, test and measures, evaluation/diagnosis, prognosis, and plan of care. They also provided evidence base interventions. Toward the end of the chapter, case studies were presented. The case studies reinforce on a clinical level the information presented earlier in the chapter.

This is an excellent text for all students entering the field of physical therapy and a good reference for practicing physical therapists, especially those with little expertise in this area. Providing early intervention to the integumentary system can prevent superficial, partial thickness, and full thickness skin involvement. These problems can lead to significant impairment, both in function and cost. A good working knowledge of the integumentary system is needed as physical therapists practice autonomously and seek direct access.

This text will assist students and physical therapists with the reference needed when this system is impaired to refer to the appropriate health care professional. I would highly recommend this text to all students, physical therapists, and clinical libraries.

Daryl Lawson, PT, DPTSc

Moffat M, Rosen E, Rusnak-Smith S, eds. *Musculoskeletal Essentials, Applying the Preferred Physical Therapist Patterns*. Thorofare, NJ: Slack Inc.; 2006. 419 pp, illus.

The text *Musculoskeletal Essentials, Applying the Preferred Physical Therapist Patterns* is a text for physical therapists and students that applies and integrates the *Guide to Physical Therapy Practice* in the treatment of musculoskeletal practice patterns. This new text is one component of *Essentials in Physical Therapy*, a 4-part series devoted to different systems referred to in the *Guide to Physical Therapist Practice*. The proposed purpose of this text is to take the *Guide* to the next level; to help bridge the gap between the *Guide* and practical clinical management of patients. *Musculoskeletal Essentials, Applying the Preferred Physical Therapist Patterns* is written by many expert clinicians and educators as contributing authors and edited by 3 main editors.

The introduction of the text describes and outlines the structure of each chapter.

Each chapter structure parallels and uses the language of the *Guide*. The text is divided into 10 chapters; each chapter describes a musculoskeletal pattern (patterns A – J) in the context of the Preferred Practice Patterns from the *Guide*. The chapters include the following patterns: Primary Prevention/Risk Reduction for Skeletal Demineralization (Pattern A), Impaired Posture (Pattern B), Impaired Muscle Performance (Pattern C); Impaired Joint Mobility, Motor Function, Muscle Performance and Range of Motion associated with: Connective Tissue Dysfunction (Pattern D), Localized Inflammation (Pattern E), Spinal Disorders (Pattern F), Fracture (Pattern G), Joint Arthroplasty (Pattern H), Bony or Soft Tissue Surgery (Pattern I), and Amputation (Pattern J). The beginning of each chapter introduces relevant anatomy, physiology, and pathophysiology constructs related to the impairment pattern. In certain impairment patterns where appropriate, imaging and pharmacology background information is presented. Each pattern is demonstrated in 3 to 5 case studies from physical therapist examination to discharge. This includes history, systems review, tests and measures, evaluation, diagnosis and plan of care, interventions, reexamination and discharge, psychological aspects, patient/client satisfaction, and references. The test and measures section provides a comprehensive listing of the type and result of appropriate tests and measures. The plan of care/prognosis section of each case study outlines the expected outcomes at the level of impairment, functional limitations, and disabilities according to the Nagi disablement model. The physical therapy evaluation provides the assessment/analysis of the test and measures and the diagnosis section incorporates the movement system diagnosis and determination of the appropriate pattern.

The intervention section of each case study describes the interventions used as well as provides rationale for selected interventions. The text does provide some evidence based support for the interventions when applicable; however, this was not a stated intention of the text. The authors do describe preferred interventions and recognize the lack of evidence currently to support certain interventions and/or those interventions whose studies have conflicting reports of efficacy.

In summary, this text lives up to expecta-

tions and stated purpose of the authors. This text is a necessary step toward defining musculoskeletal practice patterns and to continue the validation process of these patterns. The case study format in the text provides an easy to follow practical application of the *Guide to Physical Therapist Practice* for students, educators, and clinicians. The cases selected were very representative of the impairment patterns. The overview of diagnostic testing, pharmacology, and psychological aspects of the patterns I found highly informative. The text is not a “cook book” or a how to book for every type of musculoskeletal dysfunction but should serve as an excellent resource reference for integrating the *Guide* for students and all clinicians. I would highly recommend this textbook to students, educators, and clinicians who want to enhance their understanding of the *Guide* and to improve their comprehensive approach to the 5 elements of patient/client management. Congratulations to the authors and editors on achieving another important step toward the APTA’s Vision 2020.

Timothy J. McMahon, MPT, OCS

Simonian PT, Cole BJ, Bach B. *Sports Injuries of the Knee, Surgical Approaches*. New York, NY: Thieme; 2006. 203 pp. illus.

This text was written for orthopaedic sports medicine physicians as a method of providing its readers with current and innovative surgical techniques for sports-related injuries. The goal was to give the reader specific “pearls” of knee surgery related to the athlete and give practical information on the specifics of how a procedure is performed. The book has assembled 53 Orthopaedic Surgeons who are leading experts in the field of orthopaedic sports medicine from across the country. Each chapter is organized in a similar manner. It begins with the medical diagnosis, differential diagnosis, and indications for surgery. The surgical intervention is then described in great detail from fluid management, to patient positioning and instruments used. Postoperative care including medications and physical therapy are briefly discussed. Pearls and pitfalls and specialized tricks and tips are also discussed.

The book contains 32 chapters and an

index. Each chapter contains excellent illustrations, which demonstrate the surgical technique both open and arthroscopically depending on the procedure being performed. Chapters 1-4 discuss the surgical approach to the meniscus including meniscectomy, meniscus repair, and allograft transplantation. The techniques are discussed in great detail with different surgical options and fixation devices. Excellent photographs were specifically demonstrated in the allograft transplantation chapter that discusses allograft preparation and transplantation. Chapters 5-9 discuss arthroscopic procedures that are relatively common in the athletic population including debridement, microfracture procedure, osteochondritis desiccans, and autologous chondrocyte implantation. The authors also discuss ways to avoid pitfalls during the procedures. Chapters 10-12 discuss osteotomy's including lateral wedge, opening wedge, and high tibial osteotomy. Chapters 13-16 discuss anterior cruciate ligament reconstructions using bone-patellar-bone both autograft and allograft, hamstring grafts, quad tendon grafts, and revision. The risks and benefits of each graft are also discussed in detail. Chapters 17-22 discuss repair of the posterior cruciate ligament including using bone-patellar bone, Achilles tendon allograft, using the tibial inlay procedure and two-strand quadriceps tendon-patellar bone graft. Each chapter also details the risks and benefits in using the choice of graft. Chapters 23-25 involve posterior lateral knee injuries and subsequent reconstruction as well as multiligament reconstructions. Again, superb, detailed photographs are included. Chapters 25-30 involve the patella. These include lateral release, realignment for patellar instability, patellar tendon rupture, and surgery for patellar tendinosis. The last 3 chapters involve treatment of tibial plateau fractures.

This text describes a very select group of surgical techniques that a sports medicine orthopaedist may see in his/her practice. Many of these procedures have been previously described in numerous textbooks, yet the book discusses cutting edge technology for certain procedures. The illustrations are excellent and well detailed. One area that is lacking is the postoperative care and physical therapy is quite limited but this was not the intent of the book. This book is intended for orthopaedic surgeons, fellows and residents,

good reference for sports medicine physical therapists to help them better understand their patients' surgical procedures.

David M. Nissenbaum, MPT, MA, LAT

Ellenbecker TS. Shoulder Rehabilitation: Nonoperative Treatment. New York, NY: Thieme; 2006. 180 pp, illus.

This book focuses on the nonoperative care of the most common nonsurgical shoulder pathologies. The editor is an established clinician and researcher in orthopaedic and sports rehabilitation, with a concentration in the shoulder and elbow. His contributing authors are also well respected clinicians and researchers. This soft-cover book contains 2 main sections divided into 9 total chapters. Section one focuses on the rehabilitation of specific shoulder pathologies, while section two discuss special topics in shoulder rehabilitation.

The first section includes the following pathologies: shoulder impingement, instability, adhesive capsulitis, AC joint injuries, and scapular dysfunction. Each chapter contains photographs and schematic drawings to exhibit testing, mobilization, and exercise techniques.

Chapter one reviews the 3 types of impingement: primary, secondary, and internal, and discusses the rehabilitation and ideal outcomes of each. This chapter emphasizes the total range of motion concept as it specifically pertains to rotation and functional outcomes with athletes. In addition, the chapter directs the reader to look at total arm strength and functional progression throughout the rehabilitation process. The author includes both the standard references and updated research on this topic.

Chapters 2 and 3 discuss micro- and macro- instability. Chapter 2 reviews the common examination techniques and early, middle, late phases of rehabilitation leading to the return to activity. Its emphasis is on micro-instability as it relates to the overhead athlete. Chapter 3 focuses on macro-instability and provides the reader with a progression from evaluation to classification, causes, testing, neuromuscular re-ed, and functional progression. Once again, these two chapters

include both traditional and updated references to this area of rehabilitation.

The fourth chapter, Rehabilitation of Adhesive Capsulitis, emphasizes Idiopathic (Primary) Frozen Shoulder and Secondary Frozen Shoulder. It follows with treatment concepts and reviews the 4 stages of frozen shoulder: painful, freezing, frozen stage, and thawing stage. This condensed chapter mostly includes older references with just a couple of recent references of note. The chapter would be more complete if it incorporated illustrations of patient self-stretching (ie, low load stretching) and self-mobilization techniques for the less experienced reader.

Chapter 5 is one of the more refreshing and complete chapters in the text. This chapter discusses the rehabilitation of acromioclavicular joint injuries. It includes joint anatomy and biomechanics, classification of AC joint injuries, exam and presentation of AC joint injuries, and treatment of AC joint injuries. The chapter uses schematic drawings, black and white photos, an anatomical illustration, and informative tables to maintain organization and flow. Although the AC joint injuries are much less common than the preceding pathologies, this chapter will be helpful to those clinics with either heavy or light sports medicine patient mix. It is informative for the experienced and younger clinicians alike. This chapter mostly references older studies and texts.

The final chapter in section 1 is titled the Classification and Treatment of Scapular Pathology. The primary discussion is on scapulohumeral rhythm in shoulder function, scapular dysfunction in shoulder injury, physical examination of the scapula in shoulder injury, and treatment guidelines. Included are photographs of examination and treatment techniques. As more research has been done on the scapula's influence on the shoulder complex, there are many references from the last 5-10 years. Ensuring proper evaluation and treatment of scapular dyskinesis is the emphasis of this chapter.

The second section in this text is Special Topics in Shoulder Rehabilitation. There are 3 chapters in this section including: Modification of Traditional Exercises for Shoulder Rehabilitation and a Return-to-Lifting Program, Use of Taping and External Devices in Shoulder Rehabilitation, and Use of Interval Programs for Shoulder Rehabilitation. The

second section in this book really shines. There are few texts that tie these things together well with the preceding topics in section 1. For clinics that work closely with fitness centers and athletes (high or low level), this section provides good insight and alternatives to traditional rehab approaches.

The 7th chapter of this book provides in-depth discussion of how to modify your standard shoulder rehabilitation program, including the return to weight lifting. Many clinicians struggle with the transition from rehab to the standard gym work-out. The chapter topics cover the stresses on the shoulder with traditional UE PREs, modifications of specific weightlifting exercises, and ramifications of LE exercise on the shoulder. This chapter includes many illustrations exhibiting each exercise and table summaries of how to modify the exercises.

Chapter 8 covers the use of taping and external devices in shoulder rehabilitation. The chapter goes step by step in describing

how to tape with black and white pictures and instructions. The chapter includes a table summarizing studies that have been published on the effectiveness of shoulder taping. Following the taping techniques, the chapter exhibits a large table describing the many shoulder braces and their respective names, indications, comfort, and features. In addition, a table presents a summary of the studies done on the effectiveness of shoulder braces.

The final chapter, The Use of Interval Return Programs for Shoulder Rehabilitation, is the strongest in the book. It covers 3 primary overhead sports including tennis, baseball, and swimming, as well as having an excellent section on golf. The chapter connects each sport to the kinetic chain principle with the incorporation and emphasis of trunk/core strength. For each sport the chapter has a table with interval training guidelines. This can be used as a protocol for the novice clinician or as a guide for those with more

experience. In addition, the chapter has an example of a Monday through Sunday regimen for baseball players. Included is a little league interval throwing program. This is an area that many of us can be puzzled as to how much we can (or should) push the younger athletes.

In summary, this book provides the reader with refreshing all-inclusive coverage of nonoperative shoulder rehabilitation. For those of us who work closely with athletes, weekend warriors, and health club fanatics, this easy-reference book will be very helpful.

Cory B. Tovin, PT

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Dr. Jan K. Richardson is Professor/Chief of the Division of Physical Therapy, Doctor of Physical Therapy, School of Medicine, at Duke University in Durham, North Carolina.

Dr. Richardson is well known and respected for her work in orthopaedics and has published the textbook, *Clinical Orthopaedic Physical Therapy*. She is the founder of the periodical Orthopaedic Physical Therapy Clinics of North America.

Dr. Richardson is immediate Part President of the American Physical Therapy Association and was the 2001 recipient of the coveted American Physical Therapy Association's Lucy Blair Service Award. In 2004-5, she became the first physical therapist (non-MD or DDS) to be named a Hedwig Von Amerigen Fellow (National Executive Leadership in Academic Medicine for Women program, Drexel University), selected from a prestigious list of candidates nationally submitted by their academic institutions.

Her commitment to advanced physical therapist education, physical therapy research, and evidence-based practice is widely acknowledged. She has also conducted extended stay educational exchange field programs to China for physical therapists interested in eastern medical practice.

CH: Dr. Richardson, you were APTA President from 1997 – 2000. What initiatives have you been involved with since your term ended?

JKR: I have continued to be active and involved at the national level by serving as a delegate for North Carolina. I have also been dedicated to continuing promoting excellence in physical therapist education at Duke University during the past 6 years. We have established and progressively implemented the Doctor of Physical Therapy research agenda and have been proactive in the recruitment of clinician/scientists. With this emphasis on research, Duke will be in a stronger position to more effectively synergize our faculty's expertise and continue to build an effective and enhanced bridge between practice and research. Ultimately it is



but one of the progressive ways we incorporate evidence-based practice throughout the Duke curriculum.

CH: In your opinion what has been one of the significant changes that has occurred in the last 5 years in the profession.

JKR: Without a doubt it has been the evolution of Vision 2020. I remember when the California chapter first brought the idea to the House of Delegates in 1997. The idea represented an “outside of the box” mentality and acceptance. The 2020 date in the term vision 2020 was coined to develop forward thinking and belief. In reality, the plan was for integration and acceptance by 2010 or 2012. I know that we are on track with meeting this goal with enthusiasm. We are now at the point where we are accumulating critical mass through the development of DPT educational programs and the proliferation of transitional DPT programs. In the end, however, it isn't as much about the credential as it is about the representation of autonomous practice.

CH: In your opinion what career path or tasks do you see the new physical therapist graduate becoming involved (in) to fully use (exploit) the DPT credential?

JKR: From my perspective, the new physical therapist graduate will have outstanding opportunities at owning private practice(s), including nontraditional specialty areas such as Women's Health and Oncology. The scope of practice with a DPT credential will finally allow the consumer to view us as the practitioner of choice. The consumer will value our expert training in traditional inpatient and outpatient settings as well as private practice. They will positively react to our ability and value in areas dedicated to prevention/wellness and fitness. Baby boomers will not be relegated to a health care system that is based on sickness only. They will be aware and demand that physical therapists serve as expert practitioners in preventing illness and promoting wellness.

Should preventative services not be covered, the consumer will want and demand that such wellness services be part of a new health care plan. In a third party payer system, the physical therapist will be sought after and paid more often directly “out of pocket” by consumers. I see a bright future for other nontraditional roles such as animal physical therapy. The therapist will be an essential part of a collaborative team and will be viewed as a movement expert in this role. These emerging aspects all represent fertile ground for continued growth of the physical therapist in decision making for a new consumer market.

CH: Legislative forces have always had an impact on Physical Therapy. How do you prepare students for this?

JKR: Politics and government legislation is a fact of life. Our new physical therapists must understand and adapt to the political environment if they are hopeful of developing a positive environment in their chosen settings and fields of expertise. Quite frankly, this understanding of government practice is not limited to Washington and Capital Hill. Physical therapist students and practitioners must be able to serve as consumer advocates. At Duke University we are proactive in involving and encouraging students to be politically active from day one. A few years ago we took Duke students to the APTA March on Capital Hill; that gave them great exposure to the political process. When our North Carolina District merged local congressional politicians, physical therapist alumni, and incoming Duke and UNC students were invited to an event sponsored by the North Carolina Physical Therapy Association district to familiarize them with opponents in the local political system to provide them a greater awareness of the issues posing conflict.

CH: Any thoughts about what will happen down the road?

JKR: I believe there is potential for an event of perfect storm proportion for physical therapy. By this, I mean that our past efforts will lead to a point in time where a single de-

gree or credential will become the standard and evidence-based practice will be the validation of our achievement and success and forge new areas of practice in health care and delivery. I believe this will occur at about the time the predicted physician shortage becomes a reality and critical issue. By 2012 it has been predicted that there will be a short-

age of 200,000 physicians. It remains to be seen who will step into this role. I am confident in my belief that physical therapists will be uniquely qualified and positioned to serve as primary care practitioners in the field of neuromusculoskeletal care, as well as their established roles and expertise in health and wellness. However, we must be cognizant

that education, practice, and research are all interlocking pieces of a most important puzzle. It will be then that we will advance the respect and credibility in the eyes of external parties and our health care consumers.

Thank you Dr. Richardson for taking the time to share your views with *OP* readers.

ERRATUM

Two sources for the article titled, *Temporomandibular Joint and Anterior Disk Displacement* by Snigdha Bijjiga-Haff that appeared in the Volume 18 Number 1, 2006 issue of *Orthopaedic Physical Therapy Practice* were not identified.

Various statements from the article were referenced from the following sources:

Hartling D. The temporomandibular joint. In: *Therapeutic Exercise: Moving Toward Function*. 2nd ed. Hall CM, Thein-Brody L, eds. Baltimore, Md: Lippincott Williams and Wilkins; 2005:555-581.

Neumann DA. Kinesiology of mastication and ventilation. In: *Kinesiology of the Musculoskeletal System: Foundations for Physical Rehabilitation*. St Louis, Mo: Mosby; 2002:352-384.

The author regrets the error in not citing these works.

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I would like to respond to the President's Message by Dr. Cibulka. I certainly wish him well in his practice, but I'm not surprised by his situation after reading his comments. He writes about the lack of reimbursement he receives (\$40 per patient) but in the prior paragraph states "our average daily bill for therapy was somewhere between only \$40-\$60." He implicates PTs who charge more, and then insists that it is his own low reimbursement that is driving him out of business. We as physical therapists must charge appropriately for our services in order to remain viable. How can we demand respect and claim to be the top of the musculoskeletal food chain if we accept less than it would cost to see a personal trainer, masseuse, or "holistic healer?" The simple fact is that any service is only worth as much as you are willing to accept for providing them. My services are worth much more than \$40 a visit and I will not allow anyone to steal them from me for that amount (unless it's MY choice to give them away pro bono on occasion). The fact is your physi-

cal therapy services ARE worth much more. If you are only charging \$40-\$60/visit why should payers place more value on your service than you? While you may feel you are doing your patients a benefit, being driven out of business only deprives your patients of your services.

As to seeing patients for 3 diagnoses and getting paid "the same as for just 1 diagnosis," I agree, no other business does work that way, and neither should yours. I would argue that if a patient's insurance does not pay for adequate care you should explain that to them and allow them to decide how to proceed. It is not your fault or responsibility if their insurance only pays for "drive-thru" type service. I often explain to patients when there is a difference between what their insurance will pay for and what I recommend. It not only makes it their choice, but it also fosters patient responsibility for their own care.

Dr. Cibulka also states "... all of us fools who went into this field to help people are now just plain pawns or maybe we are just

suckers for the rich therapist who as businessmen just sneer and laugh at us for being so naïve!" I hope this sentiment is not shared by many other therapists. I'm not sure how many "rich" therapists there are out there (I don't know any!), but please do not fall into the old cliché of the businessman as evil. The reality is, if we don't run our practices as businesses, we won't be around to help our patients. As professionals, supervisors, or practice owners we owe it not only to our patients, but to our chosen field to be sure that our clinics remain viable while delivering the highest level of care.

We must recognize that financial success IS a significant outcome measure for any business. We accept less than our services are worth at the peril of our patients, family, employees, and community.

*Respectfully,
Matt Likins, MPT, OCS
1st Choice Physical Therapy
Sterling Heights, MI
mattlinkins@aol.com*

editorresponse

Michael T. Cibulka, PT, DPT, OCS

Dear Mr. Likins:

Thank you for your recent comments regarding my President's Message in the Volume 18 Number 3 issue of *Orthopaedic Practice* found on pages 7 through 9.

In my President's Message I tried to use my clinic as an example of the importance of getting involved with the reimbursement process. I am sorry that I left a few very important details out that may have caused some confusion. The 2 major insurance companies (each accounting for nearly 30-35% of my business) that people around my clinic have include only one type of reimbursement method and that is the per diem method. If you are going to be in the insurers plan and be a provider, you must agree to this per diem rate. The per diem rate is set by the insurance company. If I were to go out of network with either one of these plans, other local physical therapy clinics would obligingly take the in-network patients (sadly we have more supply than demand in my particular region). Thus I have

little choice but to be in these plans (much to my chagrin). If the per diem insurers only accounted for 10% or so of my practice, I would have gotten out a long time ago! Thus sadly I am stuck with this poor reimbursement rate. I have heard many physical therapists that are also in my same predicament.

I see only 2 choices. The first is to get out of the per diem plan and take my chances that people in my area will come and pay the much higher out of pocket costs. That is very unlikely; I am in a semi-rural 'blue collar' region where the average salaried worker is not wealthy. In fact with the rising co-pays, I have already seen a significant drop in my visits. The second choice would be to try and convince other local therapist's to band together and not take the per diem and try to force better pay. This may be done surreptitiously as in other businesses, however, it is usually not undertaken in our profession; we usually play by the rules. I don't know of any other choice, than these two. Oh yes I could close and move elsewhere where I have a bet-

ter payer mix, or I could work for a POPTS! Not likely. Thus I chose to teach and work in hopes that some day providers will realize the importance of physical therapy and reimburse for it fairly.

I definitely agree with you that we are worth much more than a per diem pay, which is around \$42.00 for me right now. What is our value? That is an interesting question. Physicians tried to value work; this was subsequently performed with the resource-based-relative-value-scale (RBRVS) study at Harvard back in the 80s. It was determined that 4 components make up the RBRVS. First the time required performing the service, second the technical skill and physical effort, third the mental effort and judgment, and fourth the psychological stress associated with physicians (therapists) concern about iatrogenic risk to the patient. This methodology is used for us alike; however, since we don't often deal with life and death situations the fourth component reduces our value when using this scale. I

would argue that this is wrong; our ability to prevent death and disability is worth more! I think we need to re-examine this scale and make it more appropriate for physical therapists.

Finally, I agree with much of what Mr. Likins has written. I was trying to play the devil's advocate in my address. I am glad that I hit a 'nerve' with some and do agree that we

need to be financially successful when running a business. I just hope that we can be around to do this, since many of us are at the mercy of third party payers. I wish my payer mix was as good as Mr. Likins, perhaps things will get better sometime soon, but I really don't have the time to wait around too long. One good thing I see on the horizon is that the Orthopaedic Section's major proj-

ect right now is an ICF project to develop guidelines for clinical practice. I believe that these guidelines will give the 'substance' to insurers that will convince them of our 'true' value and thus reimburse us appropriately.

Regards,

Michael T. Cibulka, PT, DPT, OCS

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Chad Daniel Humphrey, PT, MSPT, OCS
Chad Michael Williams, PT, MPT, OCS
Charles Alden Barstow, PT, MPT, OCS, COMPT
Charles L. Owen, Jr., PT, MS, OCS
Charles Zachary Sheets, PT, MSPT, OCS
Chau Khac Phan, PT, MPT, OCS
Christin Chevonne Rigoni, PT, MPT, OCS
Christine A. Mager, PT, MSPT, OCS
Christine Ann Klemish, PT, MPT, OCS
Christine Joan Lynders, PT, BS, OCS
Christine M. Yanazzo, PT, MSPT, OCS

Christine Marie Osman, PT, DPT, OCS
Christine Mary Osman, PT, DPT, OCS
Christopher Andrew Feng, PT, DPT, OCS
Christopher Jae Hoekstra, PT, DPT, OCS, CMPT
Christopher Jason Richardson, PT, OCS
Christopher John Fiander, PT, MSPT, OCS
Christopher John Kuhn, PT, MPT, COMT, OCS
Christopher Karl Kopp, PT, BSPT, OCS
Christopher Mark Jobeck, COMT, PT, DPT, MSPT, OCS
Christopher Michael Reed, PT, MPT, OCS
Christopher Peter Berchem, PT, BSPT, OCS
Cindy Ann Unsleber, PT, MS, OCS
Cory R. Ingelse, PT, MPT, OCS
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Cynthia Lynne Cory, PT, MSPT, OCS
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Dan Hartman, PT, OCS
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Daniel Pinto, PT, MSPT, OCS
Daniel Yamada, PT, MPT, OCS
Danielle Gerard Johansen, PT, OCS
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Darin Scott Borter, PT, DPT, OCS
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Darren Olson Marchant, PT, MSPT, OCS
Darren Quincy Calley, PT, OCS
David Charles Walker, PT, MPT, OCS
David Edward Johnson, PT, PhD, OCS
David Ethan Ebbecke, PT, DPT, OCS
David Keith Seagle, PT, MHS, OCS
David L. Smith, PT, MSPT, OCS
David Michael Stedjan, PT, MPT, OCS
David Shawn Smith, PT, MSPT, OCS
David Tsugio Kurihara, PT, DPT, OCS
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Derek James Clewley, PT, OCS
Derrick George Sueki, PT, DPT
Diana Jeanne Hearn, PT, BS, OCS
Donald Lyle McClune, PT, MPT, OCS
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Dorothy L. Cobb, PT, BSPT, OCS
Edmond Charles Bayer, PT, OCS
Edward John Dullmeyer, PT, MBA, OCS, CSCS

Elan Jessie Riches, PT, MPT, OCS
 Elias Haldezos, PT, MSPT
 Elizabeth Shoemaker Kevil, PT, DPT, OCS
 Emily Shannon Hughes, PT, BS, OCS
 Emily Sue Mason, PT, MPT, OCS
 Eric Jon Folkins, PT, DPT, OCS
 Eric Lawrence Jorde, PT, DPT, OCS
 Eric Scott Kopp, PT, BSPT, OCS, CSCS
 Eric Stephen Malone, PT, BS, OCS
 Eric William Roberts, PT, MSPT, OCS
 Erica Dawn Shaw, PT, MPT, OCS
 Erika P. Forsythe, PT, BSPT, MTC, OCS
 Erin Cathleen Dunlop, PT, MPT, OCS
 Flavio Moura Silva, PT, OCS, CEAS, MTC
 Forest Robertson McDowell, PT, DPT, OCS
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 Gene Joseph Schmitz, PT, MS, OCS, ATC
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 Gerard Donayre, PT, MPT, OCS
 Giselle Mary Weekes, PT, BScPT, OCS
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 Gregory Steven Ball, PT, DPT, OCS
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 Guillermo Carlos Cutrone, PT, DSc, OCS
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 H Wayne Troxell, PT, MPT, OCS
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 Hsien-Pin Chiu, PT, MS, OCS
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 Jason Eric Grandeo, PT, MPT, OCS, ATC
 Jason Patrick Keel, PT, DPT, OCS
 Jason Robert Rodeghero, PT, MTC, OCS
 Jay Joseph Richard, PT, BS, OCS
 Jay Robert Huhn, PT, DPT, OCS
 Jean Ann Timmerberg, PT, MHS, OCS
 Jeanne M Hills, PT, BA, OCS
 Jeff Paul Zelenski, PT, BS, OCS
 Jeffery David Lau, PT, DPT, OCS
 Jeffery Thomas Podraza, PT, OCS
 Jeffrey David Wood, PT, MPT, OCS
 Jeffrey G. Ebert, PT, DPT, OCS
 Jeffrey Johnathan Schmidt, PT, OCS
 Jeffrey Joseph Lawrence, PT, DPT, OCS
 Jeffrey Michael Daly, PT, MSPT, OCS
 Jeffrey Michael Smith, PT, MSPT, OCS
 Jeffrey Ray Moreno, PT, DPT, OCS
 Jeffrey Rogers Jones, PT, MPT, OCS
 Jeffrey Scott Smith, PT, MS, OCS
 Jeffrey Zamora Santos, PT, BSPT, OCS
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 Jennifer K. Swanlund, PT, OCS
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 Jennifer Mary Taylor, PT, OCS
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 Jennifer Rosenfield Ratner, PT, BS, OCS
 Jennifer Shiu Pfeiffer, PT, MS, OCS
 Jennifer Sue Hamsher, PT, OCS, ATC
 Jennifer Widell Vetter, PT, MPT, OCS
 Jenny Ann Gaillardet, PT, BSPT, OCS
 Jerilyn Stalford, PT, BA, OCS
 Jess Robert Brown, PT, MSPT, OCS
 Jessica Lynn Cloutier, PT, MPT, OCS
 Jessica Marie Keltner, PT, MPT, OCS
 Jessica Robin Swanson, PT, OCS
 Jill Denise Swilling, PT, MSPT, OCS
 Jill Victoria Klosky, PT, OCS
 Jim Jiro Eddow, PT, MPT, OCS
 Jinky S. Fran, PT, OCS
 Joanne Marie Rakich, PT, MPT, OCS
 Jodi Stephan Loeffler, PT, OCS
 Jody Eric Musick, PT, MPT, OCS
 Joel R. Dixon, PT, MPT, OCS
 Joel Thomas Fallano, PT, DPT, OCS
 Joel Vidana, Jr., PT, DPT, OCS, MTC
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 John C. Baker, PT, OCS
 John F. Rhodes, Jr., PT, DPT, MS, OCS
 John Joseph Benke, PT, BA, OCS
 John Joseph Majerus, PT, BS, OCS
 John Lauchlin McKinnon, PT, OCS
 John Randall Phinney, PT, BS, OCS
 John Richard Antoni, PT, BSPT, OCS
 John Robert Lane, PT, MSPT, OCS
 John Scott Beasley, PT, BSPT, OCS
 John Tiu, PT, CERT.MDT, OCS
 John Vernon Groves, PT, MPT, OCS
 Jon Allan Schnepel, PT, OCS
 Jon R. Chester, PT, MPT, OCS
 Jonathan Luke Acklie, PT, BSPT, OCS
 Jonathan Marc Sherwood, PT, MSPT, OCS
 Jose Arnel Villanueva, PT, MPT, OCS
 Jose Raul Lona, PT, DPT, OCS
 Joseph Abraham Weiss, PT, MSPT, OCS
 Joseph D. Tatta, PT, BA, OCS
 Joseph F. Mancino, Jr., PT, BS, OCS
 Joseph H. Dengler, MPT, OCS
 Joseph R. Aponik, PT, OCS
 Joseph Scott Sorrell, PT, OCS
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 Julie A. Sramek, PT, DPT, OCS
 Julie Ann Foster-Lane, PT, BSPT, OCS
 Julie Ann Guthrie, PT, DPT, OCS
 Julie Kathleen Tiedgen, PT, BS, OCS
 Justin Kyle Blood, PT, DPT, OCS
 Justin Martin Keller, PT, MPT, OCS
 Justin Matthew Sampley, PT, MPT, OCS
 Kahn Lee Nirschl, PT, DPT, OCS
 Karen Clark Brandenburg, PT, MSPT, OCS
 Karen Levine Anderson, PT, OCS
 Karie Ann Coalson, PT, MSPT, OCS
 Karl Erick Fry, PT, OCS
 Katherine Dickson Arnold, PT, MSPT, OCS
 Kathleen Ann Kistler, PT, BS, OCS
 Kathleen Joan Graham, PT, MSPT, OCS
 Kathleen Sarah Shaw, PT, MPT, OCS
 Kathryn Ann Ellsworth, PT, BS, OCS
 Kathryn Latimer Werda, PT, MSPT, OCS
 Keelan Ryan Enseki, PT, SCS, OCS
 Keith Michael Scott, PT, MPT, OCS
 Kelli Jo Brizzolara, PT, MSPT, OCS
 Kendra Jo Warner, PT, OCS
 Kenneth John Shannon, PT, DPT, OCS
 Kenneth M. Schaecher, PT, MS, DPT, OCS
 Kevin D. Harris, PT, MPT, OCS
 Kevin G. Cummings, PT, OCS
 Kevin Gary Schultz, PT, MPT, OCS
 Kevin H. Lysaght, PT, MPT, OCS
 Kevin O'Neill, PT, MPT, OCS
 Kevin Wayne Valdes, PT, MSPT, OCS
 Kimberley Puttuck Cohee, PT, MS, OCS
 Kimberly Ann Abell, PT, OCS
 Kimberly Ann Kollwelter, PT, DPT, OCS
 Kimberly Joy Likosky, PT, MPT, OCS
 Kimberly Renee Robinson, PT, BSPT, OCS
 Kimberly S. Broderick, PT, MS, OCS, CFMT
 Kirsten Michelle Harper, PT, BSPT, OCS
 Kristen Janine Rowland, PT, DPT, OCS
 Kristin Anne Slaughter, PT, BSPT, OCS
 Kristin Marie Amiraian, PT, MSPT, OCS
 Kristin Marie Kelley, PT, MPT, OCS
 Kristin Michelle Angelopoulou, PT, MS, OCS, ATC
 Lance K. Sasaki, PT, BA, OCS
 Larry Michael Williams, Jr., PT, OCS
 Larry Pinkney Bryant, PT, BS, OCS
 LaTrese Smith-Wynn, PT, DPT, OCS
 Laura B. Murray, PT, BA, OCS
 Laura Inga Jones, PT, MPT, OCS
 Laura Marie Opstedal, PT, DPT, OCS, CSCS
 Laurel B. Jones, PT, BSPT, OCS, CMT
 Lawrence W. Sogolow, PT, MPT, OCS
 Lea Jean Brashears, PT, OCS
 Lee Alexander Warlick, PT, OCS
 Lee Rourke O'Connor, PT, OCS
 Leslie Jensen Dobbs, PT, MPT, OCS
 Linda Ann Schneider, PT, BA, OCS
 Lisa Ann Ferguson, PT, BS, OCS
 Lisa Ann Hirn, PT, MPT, OCS
 Lisa Marie O'Block, PT, MPT, OCS
 Lisa Mechelle Jeffery, PT, DPT, OCS
 Loren Lucy Carroll, PT, MSPT, OCS
 Lowell Mark Van Tassel, PT, OCS
 Lowen Ellen Cattolico, PT, MSPT, OCS
 Lynn C. Richards, PT, BSPT, OCS
 Lynne Gramberg, PT, MSPT, OCS
 M. Andrew Pennington, PT, MPT, OCS

Maja Corne Van Eck, PT, BSPT
 Makoto Brandon Iwasaki, PT, MSPT, OCS
 Manodnya Joyen Vakil, PT, MPT, OCS
 Marc Thomas Dalton, PT, MPT, OCS
 Marci Dyan Peterson, PT, MPT, OCS
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 Maria C. Shrime, DPT, OCS
 Marina Kesler, PT, DPT, MS, OCS
 Mark A. Lyle, PT, OCS
 Mark Allen Jensen, PT, MPT, OCS
 Mark Anthony Coalson, PT, MSPT, OCS
 Mark E Cristell, PT, MS, OCS
 Mark Masaru Kozuki, PT, MA, OCS
 Mark Ryuichi Takesue, PT, MPT, OCS
 Marrow Burnette, PT, BS, OCS
 Marshall Alan Rennie, PT, OCS
 Mary Celeste Adams-Challenger, PT, MS, OCS
 Mary Louise Lugo, PT, BS, OCS
 Mathew Leighton Wise, PT, MPT, OCS
 Matthew F. Conoscenti, PT, MPT, OCS, COMT
 Matthew J. Van Vleet, PT, MSPT, OCS
 Matthew Jason Pokorny, PT, DPT, OCS
 Matthew Luke Larson, PT, OCS
 Matthew Robert Petrone, PT, BS, OCS
 Matthew Scott Williams, PT, DPT, SCS, OCS
 Matthew Trent Stehr, PT, MPT, OCS
 Matthew Ward Ostler, PT, OCS
 Maureen Miller Halat, PT, OCS
 Megan Suzanne Williams, PT, OCS
 Megumi Sawanoi, PT, MSPT, OCS
 Melanie Lee Bieniek, PT, DPT, OCS
 Melanie Lynn Gaeta, PT, BS, OCS
 Melissa Jean Lodhi, PT, MEd, OCS
 Melissa W. Kidwell, PT, MSPT, OCS
 Micah Marie Propps, PT, BSPT, OCS
 Michael Edward Lehr, PT, BS, OCS
 Michael Eric Benson, PT, MSPT, OCS
 Michael John Mangini, Jr., PT, BSPT, OCS
 Michael Todd Sams, PT, MPT, OCS
 Michele E Downs, PT, OCS
 Michele Kathryn McCarthy, PT, MSPT, OCS
 Michelle Ann Schneider, PT, DPT, OCS
 Michelle Annette Suski, PT, MPT, OCS
 Michelle Denise Parcell, PT, OCS, ATC
 Michelle E. Collie, PT, DPT, MS, OCS
 Michelle Faulkner Nicholson, PT, MSPT, OCS
 Michelle T. Nesin, PT, OCS
 Mirko Vuksic, PT, MPT, OCS
 Misha Bradford, PT, MPT, OCS
 Mitree Michael Piromgraipakd, PT, DPT, OCS
 Mollee Hope Smith, PT, DPT, OCS
 Nancy Kim, PT, MPT, OCS
 Nicholas Daniel Potter, PT, DPT, OCS
 Nicolaus Lon Woods, PT, MSPT, OCS
 Nicole Janelle Chine, PT, MPT, OCS
 Nikki M. Rivera, PT, BS, OCS
 Norman Ardio Roque, PT, BSPT, OCS
 Omi Iwasaki, PT, OCS
 Pamela Christine Mongillo, PT, MS, OCS
 Pamela Marie Jones, PT, MSPT, OCS
 Patrice Louise Davis, PT, MSPT, OCS
 Patricia Marie Davis, PT, MSPT, OCS
 Patricia Marie King, PT, MTC, MA, OCS
 Patrick C. Myers, PT, MSPT, OCS
 Paul Brian Jacob, PT, MS, OCS
 Paul Burke, PT, MSPT, OCS
 Paul D. Simonetti, PT, DPT, OCS
 Paul Eric Drumheller, PT, MPT, OCS, CSCS
 Paul Erick Westgard, PT, OCS
 Paul Swart, PT, BS, OCS
 Perry Edward Tallman, PT, DPT, SCS, OCS
 Philip A Malloy, PT, OCS
 Phillip Owen Brown, PT, MSc, OCS
 Phong Thanh Nguyen, PT, MSPT, OCS
 PJ Landers, PT, DPT, OCS
 Quinn S. Millington, PT, ECS, OCS
 R Derek Munn, PT, MPT, DPT, OCS
 Rachel Aimee Amidon, PT, MPT, OCS
 Randall Chris Moore, PT, MSPT, OCS
 Randy Lee Russell, PT, MSPT, OCS
 Rebecca Carmack Ognibene, PT, DPT, OCS
 Rebecca Reisch, PT, DPT, OCS
 Reginald Burns Wilcox, III, PT, DPT, MS, OCS
 Rita K. Uppal, PT, MSPT, OCS
 Ritika R. Gulrajani, PT, DPT, OCS
 Robert Allan Sivert Johansson, PT, MPT, OCS
 Robert Beall Swayze, PT, OCS
 Robert Bernard Leavitt, PT, MPT, OCS
 Robert Cory Blickenstaff, PT, MS, OCS
 Robert E. Roe, Jr., PT, DPT, OCS
 Robert Henry Paisie, PT, DPT, OCS, MTC
 Robert J. Capri, PT, MPT, OCS
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 Robin S. Harrington, PT, OCS
 Robyn Marie Oxley, PT, MPT, OCS
 Roderick Sanford Henderson, PT, MA, OCS
 Roger A. Muzii, PT, PhD, OCS
 Roger Dancel Magsino, PT, OCS
 Ron James Kochevar, PT, OCS
 Ronald Gary Funston, PT, OCS
 Ronald J. Seymour, PT, PhD, OCS, CSCS
 Ruth Marie Mahre, PT, MPT, OCS
 Ryan Nicholas Perry, PT, OCS
 Sally Marie Aerts, PT, OCS
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 Sarah Carroll Poulos, PT, MPT, OCS
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 Scott Keith Rezac, DPT, PT, DPT, OCS
 Scott Kinkead Siverling, PT, MSPT, OCS
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 Scott Lawrence Tebeau, PT, OCS
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 Sean Patrick Loughlin, PT, MSPT, OCS
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 Shawn William Grant, PT, BA, OCS
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 Stacey Macy Siu, PT, DPT, OCS
 Staci Denise Yount, PT, MS, OCS
 Steffen Egenes Abrahamsen, PT, MSPT, OCS
 Stephanie Lewy Gilliam, PT, MPT, OCS
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 Stephen Christopher Owens, PT, BS, OCS
 Stephen Edward Martin, PT, BS, OCS
 Stephen Matthew Levins, PT, MSc, OCS
 Stephen Matthew McCarthy, PT, MS, OCS, CMPT
 Stephen Matthew Willey, PT, DPT, OCS
 Stephen Peter Butler, PT, MS, OCS
 Stephen R. Miller, PT, BS, OCS
 Steven Boyd Mather, PT, MA, OCS
 Steven Dennis Alyassi, PT, DPT, OCS
 Steven Paul Talajkowski, PT, MPT, OCS
 Steven Paul Ziegler, PT, OCS
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 Sven Solvik, PT, OCS, CSCS
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 Tucker Clayton Schonberg, PT, MSPT, OCS
 Tye Anthony Marr, PT, OCS
 Valerie Amoss Brill, PT, BS, OCS
 Vanessa Dirani, PT, MSPT, OCS
 Victor Duraye Aguilar, PT, DPT, OCS
 Victor Flores, PT, OCS
 Walter Eric Klett, PT, MPT, OCS
 Wendy Marie Walker, PT, MPT, OCS
 William Christopher Rolle, III, PT, DPT, OCS
 William Jeffrey Jones, PT, MPT, OCS
 William Joseph Ford, PT, MS, OCS
 William Robert O'Connell, PT, OCS
 Yvonne Ruth Coombs, PT, MPT, OCS
 Zachary Michael Luce, PT, MPT, OCS

MISSION

The mission of the Orthopedic Section of the American Physical Therapy Association is to be the leading advocate and resource for the practice of Orthopaedic Physical Therapy. The Section will serve its members by fostering quality patient/client care and promoting professional growth through:

- enhancement of evidence-based clinical practice,
- advancement of education, and
- facilitation of quality research.

VISION

The Orthopaedic Section will create a multi-tiered, networked, and mentored professional development system to empower physical therapy clinicians as the preferred autonomous and evidence-based practitioners of choice for musculoskeletal care.

GOALS

Evidence-based Practice

Enhance autonomous and evidence-based clinical practice for orthopaedic physical therapists.

Objective A

Develop practice guidelines for common musculoskeletal conditions.

Objective B

Improve the ability of the orthopaedic physical therapist to identify, critically appraise, and apply the best evidence to enhance the diagnosis, management, and prevention of musculoskeletal conditions.

Objective C

Enhance the autonomous diagnosis, management, and prevention of movement-related disorders.

Membership Services

Develop a process to understand and meet the needs of our members and continue to maintain growth in membership.

Objective A

Understand and meet the needs of Orthopaedic Section members.

Objective B

Continue to demonstrate a positive growth in membership annually.

Objective C

To recruit and guide individuals willing to accept leadership positions within the Section.

Professional Development

Facilitate professional development in orthopaedic physical therapy practice.

Objective A

Provide the resources necessary to increase the number of orthopaedic residency programs.

Objective B

Provide the resources necessary to advance orthopaedic physical therapy practice to be congruent with expectations for student performance during clinical education.

Objective C

Provide multi-level educational programs at annual or regional meetings.

Objective D

Develop professional mentoring strategies for Orthopaedic Section membership.

Practitioner of Choice

Educate and promote to the public that the orthopaedic physical therapist is the practitioner of choice for the management and prevention of musculoskeletal conditions.

Objective A

Make the orthopaedic physical therapist aware of his/her responsibility in the description and marketing of his/her profession.

Objective B

Promote orthopaedic physical therapy to public entities.

Research

Provide leadership and support for performing and disseminating research and acquiring, appraising, and applying evidence for orthopaedic physical therapy.

Objective A

Establish a network of mentors for research.

Objective B

Increase Orthopaedic Section Grant submissions by 10% yearly.

Objective C

Support efforts of *JOSPT* to increase research article submissions by 5% yearly.

Objective D

Determine the strengths, weaknesses, and usefulness of the methods of research dissemination for the membership.

Objective E

Provide information of funding sources for research.

Objective F

Provide resources for publication guidelines resource center for researchers in orthopaedic physical therapy.

Objective G

Increase availability of *OP*.

Objective H

Translate evidence into practice.

Objective I

Increase the amount of information regarding research activity to the membership.

Advocacy

Advance, promote, advocate for, and protect the practice of orthopaedic physical therapy.

Objective A

Promote the orthopaedic physical therapist as the practitioner of choice for the management and prevention of musculoskeletal conditions to regulatory agencies, legislators, and payors.

Objective B

Advocate for appropriate reimbursement to the orthopaedic physical therapist. (collaborate with Private Practice)

Objective C

Attain legislative and regulatory protection of orthopaedic physical therapy practice.

Objective D

Identify alternative practice opportunities for members negatively impacted by RFP and infringement by other providers.

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BOARD OF DIRECTOR/COMMITTEE CHAIR/SPECIAL INTEREST GROUP FALL MEETING MINUTES

OCTOBER 14, 2006

Michael Cibulka, President, called a regular meeting of the Board of Directors, Committee Chairs, and Special Interest Groups of the Orthopaedic Section, APTA, Inc. to order at 1:30 PM Central Time on Thursday, October 14, 2006.

Present:

Michael Cibulka, President
Adam Smith, Membership Chair
Tom McPoil, Vice President
Chris Hughes, OP Editor
Joe Godges, Treasurer
Rob Landel, OSC Chair
Jay Irrgang, Director
Steve Clark, Finance Committee Member
Bill O'Grady, Director
Mary Ann Wilmarth, ISC Editor
Lori Michener, Research Chair
Guy Simoneau, JOSPT Editor
Bob Rowe, Practice Chair
Margot Miller, OHSIG President
Ellen Hamilton, Education Chair
Steve Paulseth, FASIG President
John Garzione, PASIG President
Tara Jo Manal, PASIG Vice President
Amie Hesbach, APTSIG President

Steve McDavitt, APTA Board Liaison
Tara Fredrickson, Executive Associate
Terri DeFlorian, Executive Director

Absent:

None

=MOTION 1= Mr. Cibulka moved to suspend the rules for this meeting to allow everyone present the right to discuss, debate, and make motions. ADOPTED (unanimous)

The meeting agenda was approved as corrected.

=MOTION 2= Ms. Wilmarth moved that Peter A. Huijbregts, PT, MSc, MHSc, DPT, OCS, MTC, CSCS, FAAOMPT, FCAMT be allowed to review the Current Concepts ISC and print these reviews in the *Journal of Manual and Manipulative Therapy*. Peter would be given a complimentary copy of the Current Concepts ISC. ADOPTED (unanimous)

=MOTION 3= Ms. Wilmarth moved that the Board of Direc-

tors approve ISC 18.2 *Efficacy for Unique Physical Therapy Interventions* be replaced with *The Female Athlete Triad*. ADOPTED (unanimous)

=MOTION 4= Ms. Hesbach moved that the Board of Directors allow the Animal SIG to allocate the remaining \$1,900 balance of the 2006 APT-SIG budget to Edsen Donato as a consultant fee (\$100 per hour) for guiding us through the process of performing a practice analysis. ADOPTED (unanimous)

=MOTION 5= Mr. Paulseth moved that the Board of Directors approve increasing reimbursement for FASIG speakers and the 3 FASIG officers for CSM 2007. ADOPTED (unanimous). Fiscal implication: \$1,000 per year for President and Vice President and \$800 per year for the Secretary/Treasurer.

=MOTION 6= Ms. Hesbach moved that the Board of Directors allow the Animal SIG to take \$1,500 from their encumbered funds for CSM speaker travel in 2007. ADOPTED (unanimous)

=MOTION 7= Mr. Godges moved that the Board of Directors charge the Animal Physical Therapist Special Interest Group to create, with the assistance of the Section's attorney, a nonprofit corporation with the goal of creating an association between Veterinarians and Physical Therapy Professionals with the objective of publishing the journal, *Animal Rehabilitation*. ADOPTED (unanimous) Fiscal implication: \$2,000 in attorney and corporate filing fees.

The Board of Directors discussed the format of the Awards Celebration at CSM and the possibility of moving the presentation of the awards to the Section Business Meeting. This would leave just the celebration party in the evening. More discussion will take place on this at a future Board meeting.

Bob Rowe discussed future involvement of the Orthopaedic Section in the area of Referral for Profit.

Tom McPoil solicited nominations for the 2007 APTA Honors and Awards. No nominations were brought forth. It was suggested that this be an agenda item annually on the Board of Directors conference call each August.

The Board discussed the APTA's request for components to contribute additional money towards the APTA Candidate Party at Annual Conference next year since APTA paid the difference of what the components contributed in 2006 and what was out-



BOARD OF DIRECTOR/COMMITTEE CHAIR/SPECIAL INTEREST GROUP FALL MEETING MINUTES

OCTOBER 14, 2006

standing. A unanimous decision was made by the Board to contribute only the \$500 budgeted.

=MOTION 8= Mr. Irrgang moved that the Orthopaedic Section seek NATABOC approval for ISCs for 2 years. ADOPTED (unanimous). Fiscal implication: \$120 annual fee plus \$60 per course approved.

=MOTION 9= Mr. Irrgang moved that the Orthopaedic Section approve a new award titled, *Bowling – Erhard Clinical Practice Award*. The first award will be given at CSM 2007. ADOPTED (unanimous).
Fiscal implication: To be determined by the Awards Committee.

Jay Irrgang reported that all of the ICF work groups have identified their conditions and are progressing with the process. The foot, hip, and cervical spine work groups will be presenting at CSM 2007.

=MOTION 10= Mr. Smith moved that the Orthopaedic Section offer a 50% discount on membership dues for those new graduates who choose to give a presentation to their physical

therapy school about their experiences as a new graduate and how the Orthopaedic Section has helped them. ADOPTED (unanimous). Fiscal implication: Waiting on approval by APTA.

=MOTION 11= Mr. Irrgang moved to form a task force to examine a new annual meeting for the Orthopaedic Section to include the year the meeting would first be held, the location, budget, and possible collaboration with other groups and report back to the Board of Directors meeting at CSM 2007. ADOPTED (unanimous)

The Board of Directors appointed the following individuals to serve on the Task Force to examine a new annual meeting for the Orthopaedic Section –

- Tom McPoil, Chair
- Beth Jones, Education Co-Chair
- Margot Miller, OHSIG President
- John Childs, Finance Committee Member

The meeting adjourned at 5:30 PM CST.

Submitted by Terri DeFlorian, Executive Director
Adopted BOD 11.14.2006

webwatch | <http://familydoctor.org/>

Familydoctor.org is maintained by the American Academy of Family Physicians (AAFP). Site organizers report that all of the information on the site has been written and reviewed by physicians and patient education professionals at the AAFP. Major web headings are categorized according to diseases commonly found in men, women, children, and seniors. A broad range of health topics are included on the site but the site is very easy to navigate. Unique information includes the smart patient guide link that includes sections on managing your health care and understanding health insurance. In addition a Health Tools section offers an online dictionary that defines common medical terms, drug information, and the ability to search by symptoms.

Keep Alert! Join PTeam Today

Do you want to help make sure issues impacting physical therapists and the patients you serve are a priority on Capitol Hill? You can help by joining APTA's Advocacy network, PTeam today. PTeam members receive Action Alerts and Information Bulletins on current legislation impacting physical therapists. Action Alerts provide talking points and link to APTA's Legislative Action Center where you can send a message directly to your member of Congress about an issue. Information Bulletins provide updates on issues like Medicare Direct Access, the Medicare Therapy Cap, new legislation to add physical therapists to the National Public Health Service Corp to qualify for student loan forgiveness and many more issues. PTeam members also receive a quarterly newsletter with advocacy tips and updates.

To join PTeam, visit www.apta.org/advocacy and click on the Keep Alert! icon or contact Mike Matlack at michaelmatlack@apta.org.

**ORTHOPAEDIC SECTION, APTA, INC.
CSM 2007 - PRECONFERENCE COURSES
BOSTON, MASSACHUSETTS**

Evaluation and Treatment of the Thoracic Spine and Rib Cage

Tuesday & Wednesday, February 13th & February 14th

Course Description:

This two day course will cover the functional anatomy and biomechanics of the thoracic spine and rib cage. Emphasis will be placed upon making a positional diagnosis for thoracic spinal dysfunction and treatment will utilize an eclectic approach with the primary emphasis on muscle energy technique. Evaluation and treatment of structural rib dysfunctions will be included. Evaluation and treatment for adverse neural tension signs in the upper extremity, commonly associated with thoracic outlet syndrome, will be presented with treatment directed toward addressing extraneural interfaces prior to neuromobilization.

Speaker: Mark R. Bookhout, PT, MS, FAAOMPT

Introduction to Utilizing a New 24 Adult Foot Type Foot Classification System and Manual Therapy Techniques for the Foot and Ankle Complex: A Hands-on Laboratory and Clinical Application Course

Tuesday & Wednesday, February 13th & February 14th

Description:

This course will introduce a new comprehensive adult foot classification method that can enhance clinical outcomes by correlating foot types to gait and body function. This program outlines a detailed methodology for the categorization of 24 adult foot types. It is based on a specific clinical algorithm used to identify a sequential order of weight bearing compensatory mechanisms, required to load the foot on the ground during gait. Each of the 24 adult foot types identified demonstrates its own specific sequence of weight bearing compensations, and a corresponding, characteristic gait patterns.

Understanding this new method of adult foot classification answers many questions as to why previous orthopedic and podiatric treatments may have inconsistencies in success. The advantages thus are many, including improved successes not only in orthotic management via better custom and non-custom fabrication methods and designs; but also in rehabilitative outcomes, the design of shoe soles, and the prediction and prevention of injuries.

This course will show how a trained examiner can learn to identify a persons foot type by simply viewing a series of static photos, and a brief video of that persons gait (ex 25-30 seconds), walking on treadmill or floor. It will be shown each foot type will have consistencies in its specific shape, arch height, weight bearing distribution of force, callus patterns, joint laxities or immobility, and predisposition to injuries, etc.

Manual therapy techniques are often an important component of a comprehensive rehabilitation program when treating individuals with foot and ankle related pathologies. Wednesday's portion of this course will focus on teaching the skills that will help clinicians improve their proficiency with manual therapy techniques directed at the joints of the foot and ankle complex. Lecture and laboratory experiences will be integrated throughout the day. Information related to evidence-based practice guidelines, anatomical and biomechanical considerations, as well the hands-on skills necessary to effectively perform the techniques will be discussed on Wednesday.

Speakers: Joseph Anthony Coletta, PTA, CPeD; Rob Martin, PhD, PT, CSCS; Roberta Nole, PT; Stephen Paulseth, DPT, SCS, ATC; Stephen Reischl, DPT, OCS; Michael Timko, PT, MS, FAAOMPT

Saying Goodbye to Managed Care: The Nuts and Bolts of Integrating Wellness, Health Promotion and Orthopaedic Physical Therapy into a Cash-based Practice

Wednesday, February 14th

Description:

This course will present the rationale and a business model for a full-spectrum cash-based musculoskeletal health, wellness, and rehabilitation clinic. Participants will learn specific strategies for overcoming roadblocks, as well as, designing, marketing, and implementing health promotion, fitness, and wellness services. The model and strategies presented are based on the speakers' own experience in a successful, full-spectrum cash practice in Arlington, VA.

Speakers: Jennifer Gamboa, DPT, OCS, MTC; Nancy White, MSPT, OCS

Check out our web site for more details on these preconferences, programming schedules, and online handouts: www.orthopt.org



CSM 2007 PROGRAMMING

BOSTON, MA, FEBRUARY 13 – 18, 2007

TUESDAY, FEBRUARY 13

8:00 am - 5:00 pm

Evaluation and Treatment of the Thoracic Spine and Rib Cage

Speaker: Mark R Bookhout, PT, MS, FAAOMPT, Shorewood, MN

8:00 am - 5:00 pm

Introduction to a New 24 Adult Foot Type Foot Classification System and Manual Therapy Techniques for the Foot and Ankle Complex

Speakers: Joseph Anthony Coletta, PTA, Albany, NY; Roberta Nole, PT, Middlebury, CT

WEDNESDAY, FEBRUARY 14

8:00 am - 4:00 pm

Saying Goodbye to Managed Care: The Nuts and Bolts of Integrating Wellness, Health Promotion and Orthopaedic Physical Therapy into a Cash-based Practice

Speakers: Jennifer Mahler Gamboa, PT, MPT, OCS, MTC, Arlington, VA; Nancy T. White, PT, MS, OCS, Arlington, VA

8:00 am - 5:00 pm

Evaluation and Treatment of the Thoracic Spine and Rib Cage (second day)

Speaker: Mark Bookhout, PT, MS, FAAOMPT, Plymouth, MN

8:00 am - 5:00 pm

Introduction to a New 24 Adult Foot Type Foot Classification System and Manual Therapy Techniques for the Foot and Ankle Complex (second day)

Speakers: Rob Roy L Martin, PT, PhD, CSCS, Pittsburgh, PA; Steve Paulseth, PT, MS, SCS, DPT, ATC, Long Beach, CA; Stephen F Reischl, PT, DPT, OCS, Long Beach, CA; Michael Timko, PT, MS, FAAOMPT, Pittsburgh, PA

3:00 pm – 7:00 pm

OHSIG Board of Directors Meeting

THURSDAY, FEBRUARY 15

8:00 am - 11:00 am

The Globalization of Physical Therapy During War: Spectrum of Care Across Different Levels of Medical Care, Settings, Ages, Cultures, and Disciplines

Speakers: Jill Black Lattanzi, PT, EdD, Lewes, DE; Heather Lynn Malecki, PT, Lorton, VA; LTC Josef H Moore, PT, PhD, SCS, ATC, Ft Sam Houston, TX; LTC. Barbara A Springer, PT, PhD, OCS, SCS, Washington, DC; Dr. Watts, Los Angeles, CA

11:30 am - 1:30 pm

Orthopaedic Platform Presentation Session A – Spine

11:30 am - 1:30 pm

Orthopaedic Platform Presentation Session B (concurrent session) – Foot & Ankle

11:30 am - 1:30 pm

Occupational Health PT SIG Programming - Changing the Paradigm of Work Rehab: Generating/Developing Positive Results for Workers and Therapists

Speakers: Deidre 'Dee' Daley, PT, OHPTSIG, Southern Pines, NC; Barbara Lea McKelvy, PT, Westerville, OH; Helen Fearon, PT, Paradise Valley, AZ

1:30 pm – 3:30 pm

Occupational Health PT SIG Programming - The Role of the Occupational Health Physical Therapist: New (and Profitable) Frontiers

Speakers: Kathleen Rockefeller, PT, ScD, MPH, Tampa, FL; Margot M. Miller, PT, Cloquet, MN; Deborah Lechner, MS, PT, Birmingham, AL; Drew Bossen, PT, Iowa City, IA

11:30 am - 3:30 pm

Animal PT SIG Programming - Who Let the Dogs Out?!

Speakers: Caroline Adamson, PT, MS, Denver, CO; Sherman O. Canapp, Jr., DVM, MS, Gaithersburg, MD; Laurie M. Egde-Hughes, BScPT, CAFCI, CCRT, MAnimSt (Animal Physio); Charles Evans, PT, Lee, NH; Amie Lamoreaux Hesbach, PT, Huntington, MD; Lin McGonagle, PT, Genoa, NY

11:30 am - 2:30 pm

Recent Advances in the Management and Rehabilitation of Proximal Humerus Fractures, Shoulder Arthritis, and Frozen Shoulder

Speakers: Martin J Kelley, PT, DPT, OCS, Philadelphia, PA; Brian G Leggin, PT, DPT, OCS, Philadelphia, PA

12:30 pm - 2:30 pm

Use of the International Classification of Functioning to Develop Evidence-Based Treatment Guidelines for Common Musculoskeletal Conditions

Speakers: Joseph Godges, PT, DPT, MA, OCS, Los Angeles, CA; James J Irrgang, PT, PhD, ATC, Pittsburgh, PA

1:30 pm - 4:30 pm

The Contribution of Abnormal Hip Mechanics to Knee Injury: A Top-Down Perspective

Speakers: G Kelley Fitzgerald, PT, PhD, OCS, PA; Christine Pollard, PT, PhD, Los Angeles, CA; Christopher M Powers, PT, PhD, Los Angeles, CA; Gretchen B Salsich, PT, PhD, Saint Louis, MO; Susan M Sigward, PT, PhD, ATC, Los Angeles, CA

3:30 pm - 4:30 pm

Animal PT SIG Business Meeting

3:30 pm - 4:30 pm

Occupational Health PT SIG Business Meeting

6:00 pm - 10:00 pm

Orthopaedic Section Board of Directors Meeting

FRIDAY, FEBRUARY 16

8:00 am - 11:00 am

MRI and Ultrasound Imaging in the Lower Extremity

Speakers: Kathleen A Brindle, MD, Washington, DC; Timothy J Brindle, PT, PhD, ATC, Bethesda, MD

8:00 am - 11:00 am

Structural Differentiation Diagnosis of the Shoulder, Cervical Spine, and Thoracic Spine

Speakers: Joshua Cleland, PT, DPT, OCS, Concord, NH; Chad Cook, PT, PhD, MBA, OCS, COMT, Durham, NC

9:00 am - 11:00 am

Orthopaedic Platform Presentation Session A – Hip and Knee

9:00 am - 11:00 am

Orthopaedic Platform Presentation Session B – Shoulder, Occupational Medicine, Performing Arts

1:00 pm - 3:00 pm

Orthopaedic Platform Presentation A – Shoulder

1:00 pm - 3:00 pm

Orthopaedic Platform Presentation B – Spine

1:00 pm - 5:00 pm

Pain Management SIG/Manual Therapy Education Group Programming - Headaches & the Cervical Spine

Speaker: Marian Brame, MA, PT, Walnut Creek, CA

1:00 pm - 5:00 pm

Foot & Ankle SIG Programming - A Comprehensive Update on Ankle Instability

Speakers: James Burns, MPT, Pittsburgh, PA; Rob Roy L Martin, PT, PhD, CSCS, Pittsburgh, PA; Steve Paulseth, PT, MS, SCS, DPT, ATC, Long Beach, CA; Stephen F Reischl, PT, DPT, OCS, Long Beach, CA; Tara Michele Ridge, PT, SCS, Pittsburgh, PA; Dane Wukich, MD, Pittsburgh, PA

1:00 pm - 5:00 pm

Performing Arts SIG Programming - Evaluation, Rehabilitation and Medical Management of the Hip Joint Through the Lifespan of the Performing Artist - An Evolving Art

Speakers: Pierre d'Hemecourt, MD, Boston, MA; Keelan R Enseki, PT, MS, OCS, SCS, ATC, CSCS, Pittsburgh, PA; Tara Jo Manal, PT, DPT, OCS, SCS, Newark, DE; Rob Roy L Martin, PT, PhD, CSCS, Pittsburgh, PA; Heather L. Southwick, MS PT, Walpole, MA; Michelina Cassella, PT, Boston, MA

2:00 pm - 4:00 pm

Research Information Exchange Center

Speakers: Maj John D Childs, PT, PhD, MBA, OCS, FAAOMPT, San Antonio, TX; G Kelley Fitzgerald, PT, PhD, OCS, Pittsburgh, PA; J. Parry Gerber, PT, DSc, ATC, Salt Lake City, UT; James J Irrgang, PT, PhD, ATC, Pittsburgh, PA; Michael Johnson, PT, MS, OCS, Philadelphia, PA; Carolynn Pattern, PT, PhD, Palo Alto, CA; Christopher M Powers, PT, PhD, Angeles, CA; David Sinacore, PT, PhD, St Louis, MO; Patrick Sparto, PT, PhD, Pittsburgh, PA; Deydre Smyth Teyhen, PT, PhD, OCS, US Fort Sam Houston, TX

3:30 pm - 5:00 pm

Orthopaedic Certified Specialist (OCS) Exam and Description of Specialty Practice (DSP) – What's the Deal?

Speakers: Joseph Godges, PT, DPT, MA, OCS, Los Angeles, CA; Richard Ritter, PT, DPT, OCS, Hayward, CA

5:00 pm - 6:00 pm

Foot and Ankle SIG Business Meeting

5:00 pm - 6:00 pm

Pain Management SIG Business Meeting

5:00 pm - 6:00 pm

Performing Arts SIG Business Meeting

6:00 pm - 7:30 pm

Performing Arts SIG Reception

6:00 pm - 7:30 pm

Foot & Ankle SIG Reception

SATURDAY, FEBRUARY 17

8:30 am - 11:00 am

Orthopaedic Section Business Meeting

1:00 pm - 2:00 pm

Rose Excellence in Research Award Recipient Platform Presentation

1:00 pm - 4:00 pm

PTA Education Group Programming - A Hands-on Approach to Treating Swelling in the Orthopaedic Patient

Speaker: Kim Salyers, MA Ed, PTA, CLT-LANA, Marietta, OH

2:00 pm - 4:00 pm

Orthopaedic Platform Presentation Session A – Spine, Elbow, Other

2:00 pm - 4:00 pm

**Orthopaedic Platform Presentation Session B
(concurrent session) – Hip & Knee**

2:00 pm - 5:00 pm

**Primary Care Education Group Programming –
Movement System Impairment Diagnoses: a Contributor
to Achieving Vision 2020**

Speaker: Shirley Sahrman, PT, PhD, FAPTA, St Louis, MO

6:30 pm - 7:30 pm

Orthopaedic Section Awards Ceremony

7:30 pm - 11:00 pm

Rose Award Celebration

PLATFORM PRESENTATIONS

CSM 2007, Boston, MA

THURSDAY

Platform Presentations Session A: Spine

11:30 am -1:30 pm Convention Center 309

Moderator: Sheri Silfies, PT, PhD, OCS

Multiple Level .2 CEU

Preliminary Examination of the Validity of a Proposed
Classification System for Patients with Neck Pain Receiving
Physical Therapy

11:30 am – 11:45 am

Speaker: Julie Fritz, PT, PhD, ATC, Salt Lake City, UT

Short-Term Response of Thoracic Spine Thrust Versus
Non-thrust Manipulation in Patients with Mechanical Neck Pain:
A Randomized Clinical Trial

11:45 am – 12:00 noon

Speaker: Joshua Cleland, PT, DPT, OCS, Hillsboro, NH

Preliminary Study of Two Factors that Predict Improved
Outcome in Patients with Neck Pain Using Thoracic
Manipulation

12:00 noon – 12:15 pm

Speaker: Gerard Brennan, PT, PhD, Salt Lake City, UT

Comparison of Short-term Response to Two Spinal
Manipulation Techniques for Patients with Low Back Pain

12:15 pm – 12:30 pm

Speaker: Lancy Mabry, PT, Ft. Sam Houston, TX

Effect of Classifying Patients with Spinal Syndromes by Pain
Pattern and Fear Avoidance Beliefs of Physical Activity

12:30 pm – 12:45 pm

Speaker: Mark Werneke, PT, Freehold, NJ

Effect of Time-Dependent Classification of Patients with
Spinal Syndromes by Pain Pattern and Fear of Physical
Activities on Functional Status, Pain, Treatment Visits
and Episode Duration

12:45 pm – 1:00 pm

Speaker: Mark Werneke, PT, Freehold, NJ

Effectiveness of an Extension-Oriented Treatment Approach
in a Subgroup of Patients with Low Back Pain: A Randomized
Clinical Trial

1:00 pm – 1:15 pm

Speaker: David Browder, PT, OCS, San Antonio, TX

Characteristics, Outcomes and Visit Utilization of Patients Eval-
uated and Treated Using a Treatment-Based Classification System:
Analysis of 6320 Patients

1:15 pm – 1:30 pm

Speaker: Stephen Hunter, PT, OCS, Salt Lake City, UT

THURSDAY

Platform Presentations Session B: Foot & Ankle

11:30 am -1:30 pm Convention Center 310

Moderator: Paul Beattie, PT, PhD, OCS

Multiple Level .2 CEU

Variations in Foot Posture and Mobility Between Individuals
with Anterior Knee Pain and Controls

1:45 am

Speaker: Thomas McPoil, PT, PhD, ATC, Flagstaff, AZ

Reliability of the Foot Posture Index

11:45 am – 12:00 noon

Speaker: Mark Cornwall, PT, PhD, CPed, Flagstaff, AZ

The Effectiveness of Iontophoresis with 4 mg/ml Dexamethasone
Versus 5% Acetic Acid in Patients Diagnosed With Plantar Fasciitis

12:00 noon – 12:15 pm

Speaker: Joel Fallano, PT, DPT, Boston, MA

Influence of Running Shoe Type on Distribution and Magnitude
of Plantar Pressures Across the Planus and Cavus Foot

12:15 pm – 12:30 pm

Speaker: Nancy Yeykal, PT, Ft. Sam Houston, TX

Effect of the AirLift PTTD Brace on Foot Kinematics in subjects
with Stage II Posterior Tibial Tendon Dysfunction

12:30 pm – 12:45 pm

Speaker: Christopher Neville, PT, Rochester, NY

Evidence of Validity for the Foot and Ankle Ability Measure
(FAAM) in Individuals with Chronic Ankle Instability.

12:45 pm – 1:00 pm

Speaker: Christopher Carcia, PT, Pittsburgh, PA

Immobilization-induced Bone Loss in Diabetic Foot Diseases

1:00 pm – 1:15 pm

Speaker: David Sinacore, PT, PhD, FAPTA, St. Louis, MO

Bone Mineral Density of the Tarsals and Metatarsals after Immobilization and Non-weightbearing Followed by Reloading

1:15 pm – 1:30 pm

Speaker: Mary Hastings, PT, DPT, ATC, St. Louis, MO

FRIDAY

Platform Presentations Session A: Hip and Knee

9:00 am -11:00 am Convention Center 209

Moderator: Linda van Dillen, PT, PhD

Multiple Level .2 CEU

Hyaluronan in Human Synovial Fluid: Relationship to Osteoarthritis

9:00 am – 9:15 am

Speaker: Sharon Dunn, PT, MHS, OCS, Shreveport, MS

Effects of Early Progressive Eccentric Exercise on Muscle Structure after Anterior Cruciate Ligament Reconstruction

9:15 am – 9:30 am

Speaker: John Gerber, PT, PhD, SCS, ATC

A Comparison of Two Instrument-Assisted Soft Tissue Mobilization Techniques: Effects on Therapist Discomfort/Fatigue and Treatment Time

9:30 am – 9:45 am

Speaker: Mary Loghmani, PT, MS, MTC, Indianapolis, IN

Long-term Effects of Instrument-Assisted Cross Fiber Massage on Healing Medial Collateral Ligaments

9:45 am – 10:00 am

Speaker: Mary Loghmani, PT, MS, MTC, Indianapolis, IN

Use of Rehabilitative Ultrasound Imaging to Characterize Abdominal Muscle Structure and Function in Lower Extremity Amputees

10:00 am – 10:15 am

Speaker: Norman Gill, PT, DSc, MPT, OCS

Use of Diagnostic Imaging to Identify of Liposarcoma

10:15 am – 10:30 am

Speaker: Matthew Garber, PT, DSc, OCS

Evidence of Reliability and Responsiveness for the HHip Outcome Score (HOS)

10:30 am – 10:45 am

Speaker: RobRoy Martin, PT, PhD, CSCS

Evidence of Validity for the Hip Outcome Score (HOS) in the Outcome Assessment of Hip Arthroscopy

10:45 am – 11:00 am

Speaker: RobRoy Martin, PT, PhD, CSCS

FRIDAY

Platform Presentations Session B: Shoulder, Occupational Medicine, Performing Arts

9:00 am -11:00 am Convention Center 206

Moderator: Lori Michener, PT, PhD, ATC, SCS

Multiple Level .2 CEU

The Long Road: Rehabilitation and Functional Recovery from Latissimus Dorsi Transfer After 3 Failed Rotator Cuff Repairs

9:00 am – 9:15 am

Speaker: Airelle Hunter-Giordano, PT, Newark, DE

Does Rehabilitation Intensity Affect the Prognosis of a Functional Recovery in a Skeletally Immature Female Gymnast with a Non-reduced Type-2 Manubriosternal Dislocation?

9:15 am – 9:30 am

Speaker: Peter Pidcoke, PT, PhD

Interrater Reliability of a Behaviorally-Anchored Lift Task Evaluation

9:30 am – 9:45 am

Speaker: H. James Phillips, PT, PhD, OCS, FAAOMPT, Orange, NJ

Effect of an In-house Comprehensive Management Program on Injury Rates and Health Care Costs

9:45 am – 10:00 am

Speaker: Sheyi Ojofeitimi, PT, Brooklyn, NY

Flexor Hallucis Longus Tendinitis in a Dancer

10:00 am – 10:15 am

Speaker: Christine Berglund, PT, St. Augustine, FL

Injury Patterns in Elite Adolescent Preprofessional Ballet Dancers and the Use of Screening Data to Describe and Predict Injury Characteristics

10:15 am – 10:30 am

Speaker: Jennifer Gamboa, PT, DPT, OCS, Arlington, VA

The Gymnastics Functional Measurement Tool: Pilot Validation of a Physical Abilities Field Test for Competitive Gymnasts

10:30 am – 10:45 am

Speaker: Mark Sleeper, PT, OCS, Chicago, IL

Comprehensive Injury Surveillance of Dance Injuries: A Proposal for Uniform Reporting Guidelines for Professional Companies

10:45 am – 11:00 am

Speaker: Shaw Bronner, PT, MHS, EdM, OCS

FRIDAY

Platform Presentations Session A: Shoulder

1:00 pm - 3:00 pm Convention Center 206

Moderator: Paul Beattie, PT, PhD, OCS

Multiple Level .2 CEU

Direct Measurement of the Sternoclavicular and Acromioclavicular Joints during Elevation of the Arm

1:00 pm – 1:15 pm

Speaker: Paula Ludewig, PT, PhD, Minneapolis, MN

Ultrasonographic Measurement of the Acromiohumeral Distance in Patients with Rotator Cuff Disease, A Pilot Study

1:15 pm – 1:30 pm

Speaker: Nitin Kalra, PT, Richmond, VA

The Effectiveness of Translational Manipulation under Interscalene Block for Treatment of Adhesive Capsulitis of the Shoulder: A Prospective Clinical Trial

1:30 pm – 1:45 pm

Speaker: Ian Lee, PT, OCS, Fort Riley, KS

Plasticity of Muscle Architecture after Acute Supraspinatus Tear

1:45 pm – 2:00 pm

Speaker: Samuel Ward, PT, PhD, La Jolla, CA

Effect of Two-speed Manual Wheelchair Wheel on Shoulder Pain in Wheelchair Users

2:00 pm – 2:15 pm

Speaker: Margaret Finley, PT, Baltimore, MD

Reliability of Clinical Test to Detect Scapular Dyskinesia

2:15 pm – 2:30 pm

Speaker: Steven Kareha, PT, Glenside, PA

Validity of a New Test for Scapular Dyskinesia

2:30 pm – 2:45 pm

Speaker: Angela Tate, PT, Glenside, PA

Effect of the Scapula Reposition Test on Impingement Symptoms and Elevation Strength in Overhead Athletes

2:45 pm – 3:00 pm

Speaker: Angela Tate, PT, Glenside, PA

FRIDAY

Platform Presentations Session B: Spine

1:00 pm - 3:00 pm Convention Center 209

Moderator: Lori Michener, PT, PhD, ATC, SCS

Multiple Level .2 CEU

The Use of Magnetic Resonance Imaging to Quantify Diffusion of Water in Normal and Abnormal Lumbar Intervertebral Discs

1:00 pm – 1:15 pm

Speaker: Paul Beattie, PT, PhD, OCS, Columbia, SC

Radiographic Factors Associated with Long-term Physical Therapy Outcomes of Patients with Lumbar Spinal Stenosis

1:15 pm – 1:30 pm

Speaker: Stephen Hunter, PT, OCS, Salt Lake City, UT

A Pilot Study of Trunk Muscle Reflexes in Females with and without Subacute Low Back Pain

1:30 pm – 1:45 pm

Speaker: Tammy Wadsworth, PT, Columbus, OH

Sex Differences in Response to Trunk Strengthening Exercises in the Management of Nonspecific Low Back Pain

1:45 pm – 2:00 pm

Speaker: Lee Rielly, PT, Shreveport, LA

Neuromuscular Electrical Simulation as an Adjunct to Traditional Lumbar Stabilization Exercises for Patients with Lumbar Segmental Instability: A Case Series

2:00 pm – 2:15 pm

Speaker: Christian Lyons, PT, MS, OCS, SCS, MacDill AFB, FL

Improved Contraction of the Lumbar Multifidus Following Spinal Manipulation: A Case Study Using Rehabilitative Ultrasound Imaging.

2:15 pm – 2:30 pm

Speaker: Alexander Brenner, PT, MPT, OCS, Fort Knox, KY

Elevated Fear-Avoidance Beliefs for Subjects Participating in Physical Therapy Clinical Trials

2:30 pm – 2:45 pm

Speaker: Steven George, PT, PhD, Gainesville, FL

Outcomes for Employees Participating in Low Back Education and Training

2:45 pm – 3:00 pm

Speaker: Eric Passey, PT, Salt Lake City, UT

SATURDAY

Platform Presentations Session A: Spine, Elbow, Other

2:00 pm - 4:00 pm Convention Center 206

Moderator: Lori Michener, PT, PhD, ATC, SCS

Multiple Level .2 CEU

Measurement of Changes in Hand Temperature during the Upper Limb Tension Test Using Thermal Imaging

2:00 pm – 2:15 pm

Speaker: Nancy Quick, PT, PhD, Portland, ME

Changes in Blood Flow Velocity in the Radial Artery during the Upper Limb Tension Test

2:15 pm – 2:30 pm

Speaker: Nancy Quick, PT, PhD, Portland, ME

Direct Access Physical Therapy for Soldiers with Acute Musculoskeletal (MS) Injuries

2:30 pm – 2:45 pm

Speaker: Alexander Brenner, PT, MPT, OCS, Fort Knox, KY

Physical Therapy and Prosthetic Management of Iraqi Amputees in Support of OIF Reconstruction Operations

2:45 pm – 3:00 pm

Speaker: Matthew Scherer, PT, Washington, DC

Implementation of a Direct Access Musculoskeletal Injury Clinic in a University Setting

3:00 pm – 3:15 pm

Speaker: Paul Mintken, PT, OCS, Denver, CO

Development of an Outcomes-Based Pay-for-Performance Process for Outpatient Physical and Occupational Therapy

3:15 pm – 3:30 pm

Speaker: Dennis Hart, PT, PhD, White Stone, VA

Feasibility of Implementing an Outcomes-Based Pay-for-Performance Process for Patients Receiving in Outpatient Physical or Occupational Therapy: Medicare Part B

3:30 pm – 3:45 pm

Speaker: Dennis Hart, PT, PhD, White Stone, VA

Delayed Episodic Pain Flares Secondary to Stress Induced Release of Thyroxine in Patients with Neuropathic Pain Syndromes

3:45 pm – 4:00 pm

Speaker: Roger Allen, PT, PhD, Tacoma, WA

SATURDAY

Platform Presentations Session A: Hip and Knee

2:00 pm - 4:00 pm Convention Center 207

Moderator: Lori Michener, PT, PhD, ATC, SCS

Multiple Level .2 CEU

Resolving Knee Flexion Deficits in an Athrofibrotic Knee Following a Patellar Fracture

2:00 pm – 2:15 pm

Speaker: Kaja Kilburn, PT, Newark, DE

Relationships between Tibiofemoral Rotation, Patellar Alignment, and Patellofemoral Joint Contact Area in Subjects with and without Patellofemoral Pain

2:15 pm – 2:30 pm

Speaker: Gretchen Salsich, PT, PhD, St. Louis, MO

Asymmetrical Kinetics and Kinematics Persist One Year after Total Knee Arthroplasty during a Return-to-Sit Task

2:30 pm – 2:45 pm

Speaker: Sara Farquhar, PT, Newark, DE

Strength Training Improves Muscle Strength, Power, Volume and Overall Mobility One Year Following Total Knee Replacement

2:45 pm – 3:00 pm

Speaker: Whitney Meier, PT, OCS, Salt Lake City, UT

Muscle Stabilization Strategies in Persons with Medial Knee Osteoarthritis: The Effect of Instability

3:00 pm – 3:15 pm

Speaker: Laura Schmitt, PT, Newark, DE

Frontal Plane Projection Angles of the Knee During Single Leg Squats Among Females with and without Patellofemoral Pain

3:15 pm – 3:30 pm

Speaker: John Willson, PT, Newark, DE

Influence of Trunk Position on Lower Extremity Biomechanics During a Forward Lunge

3:30 pm – 3:45 pm

Speaker: Shawn Farrokhi, PT, Los Angeles, CA

The Relationship between Hamstring Flexibility and Knee Flexion Torque Production

3:45 pm – 4:00 pm

Speaker: Judith Alonso, PT, Somerset, NJ

educationcommittee report

Ellen Hamilton, Chair

It has been my pleasure to serve on the Education Committee for the last 12 years, serving as Chair for the last 3 years. The main function of this committee is to coordinate programming at CSM. It is comprised of the Chair, Vice-Chair, and the program planners for the 5 Special Interest Groups and the 4 Education Groups. I would like to commend my committee for consistently providing excellent educational sessions at our annual meeting. They seek out topics and speakers that are on the cutting edge and, as many of you know, our sessions are among the most heavily attended at CSM each year. These individuals do a lot of hard work, so please give them your thanks. A special commendation goes to Tara Fredrickson at the Section Office who works tirelessly to coordinate all of our forms, answer questions, provide all of our materials, and communicate with the APTA. She manages to do this with a smile on her face regardless of how frustrating it can be. I have truly enjoyed working with her. I would also like to commend all of the speakers who submit proposals every year to present for our Section. It is so exciting to go through these proposals and see what PTs are doing all around the country and how evidence is beginning to validate treatment interventions. We have had some wonderful presentations.

This year Beth Jones from New Mexico will be taking over as Chair of the Education Committee. She has been working with us for the last 3 years so is ready to take the reins. With an academic as well as a clinical background, she is well-suited to chair this committee and has some great ideas.

I appreciate the opportunity to have served the Orthopaedic Section. I have met many PTs and learned a lot. Please come to CSM and see for yourself how great the programming is. You will definitely come away with new ideas, new contacts from all over the country, and new enthusiasm for treating your patients.

Ellen Hamilton, Chair

Committee Members:

Beth Jones, Vice-Chair

Tara Fredrickson, Section Staff

Dee Daley, Occupational Health SIG

Gina Epifano, Animal SIG

Marie Hoeger Bement, Pain SIG

RobRoy Martin, Foot and Ankle SIG

Tara Jo Manal, Performing Arts SIG

Bob DuVall, Primary Care Education Group

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occupationalhealth

SPECIAL INTEREST GROUP

MESSAGE FROM THE OHSIG PRESIDENT Greetings OHSIG Members!

A few updates regarding OHSIG activities.

1. OHSIG's OSHA Alliance Task Force continues its work to draft the Alliance Agreement between APTA and OSHA. The goal is to have the agreement finalized by the end of the year. OHSIG Task Force Chairs, Kathy Rockefeller and Drew Bossen, are working closely with APTA's Practice Chair, Ken Harwood.
2. The Occupational Health Specialization Certification Task Force continues its work toward specialist certification in Occupational Health. If you have not had the opportunity to complete the OH Survey, please contact Jennifer Steiner (jennifer.steiner@healthsouth.com) or Margot Miller (mmiller@workwell.com) for a copy of the survey. The next steps include completing all paperwork required of ABPTS (American Board of Physical Therapy Specialties) in support of specialist certification.
3. I had the opportunity to be part of the Orthopaedic Section's Strategic Planning meeting in LaCrosse, Wisconsin October 12-14, 2006. A lot of work went into revising the Section's next 3-year Strategic Plan! It was a great opportunity to meet and interact with the Orthopaedic Section Board of Directors, and with the other SIG representatives as well. We decided we have much to share with each other as SIGs and plan for all board members to meet at CSM.

As always, if you have questions or comments, please contact any of the Board Members who work on your behalf! You can find the OHSIG officer listing at <http://www.orthopt.org/>.

*Sincerely,
Margot Miller, PT
OHSIG President*

OCCUPATIONAL HEALTH SPECIAL INTEREST GROUP'S EDUCATION PROGRAMS AT THE 2007 COMBINED SECTION MEETING

Changing the Paradigm of Work Rehabilitation: Generating/Developing Positive Results for Workers and Therapists

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will be presented. Improved tools and strategies for functional return to work will be discussed. The goal is to improve worker and practitioner outcomes through utilization of new and proven techniques combined with earlier recognition and resolution of barriers to successful outcomes. Expanding the dialogue beyond the current APTA Occupational Health Guidelines for Work Conditioning and Work Hardening will integrate rehabilitation of the injured worker into clinical practice for improved outcomes.

Role of the Occupational Health Physical Therapist: New (and Profitable) Frontiers

Practice and reimbursement models are expanding based upon positive outcomes, cost savings, expanded clinical practice, and better understanding of the value of physical therapists in occupational health. The results of the Occupational Health Physical Therapy Practice Analysis identify specific skill-sets for therapists working in this specialty. Join us in focus groups during the second half of this program to further define the expanding role of physical therapy in occupational health.

So, if you are new to this specialty or looking to expand your practice, enhance your expertise, and/or improve the outcomes of your occupational health practice, join us at 2007 CSM.

THE PT DIAGNOSIS: CREDIBLE OR CREDIT-LESS?

Gwen Simons, PT, JD, OCS, FAAOMPT

Differential diagnosis by physicians has recently come under scrutiny in the courts. Courts frequently require that a treating physician's opinion meet the standards for expert opinion testimony to be admissible as evidence. Other administrative agency procedures (social security disability or workers' compensation hearings in some states) have lower standards for the admissibility of expert testimony. I discuss these standards in detail as applied to functional capacity evaluations (FCEs) in an article in the October issue of PT Products magazine.¹ But how do these standards apply to the PT diagnosis in musculoskeletal injuries? Can we learn from the court's scrutiny of the medical diagnosis to improve the credibility of our professional PT opinion?

The reliability of a differential diagnosis opinion is frequently questioned in cases where causation must be determined before liability can be assigned.² Treating physicians who reach a differential diagnosis through a 'deliberative process' have been given

¹Gwen Simons, *Credibility Crisis in FCEs*, PT Products Magazine, Oct. 2006. Available at <http://www.ptproductsonline.com/article.php?s=PTP/2006/10&p=3>

more credibility than experts who formulate opinions without conducting their own physical exam.³ However, where the treating physician focuses more on identifying and treating the condition rather than determining causation, his or her opinion may not be given credibility.⁴ The *Westerberry* Court gave full recognition to differential diagnosis as “a standard scientific technique of identifying the cause of a medical problem by eliminating the likely causes until the most probable one is isolated.”⁵ However, before liability for causation can be attached, the differential diagnosis must both rule out other causes to rule in the specific cause.⁶

Physical therapists are not frequently relied on as causation witnesses. However, we are frequently used as experts to quantify disabilities or determine work capacity in personal injury, workers’ compensation, and disability cases. The PT’s expert opinion must meet the standards for expert evidence under the rules of the court or administrative tribunal that has jurisdiction.⁷ If we analyze our PT diagnosis/opinion as courts have analyzed the physician’s medical diagnosis, do we pass the test? Does our clinical reasoning use a ‘deliberative process’ and ‘intellectual rigor’ to reach a reliable and credible conclusion? Do we formulate opinions of claimants/clients by relying on medical records from others without performing our own physical exam? Do we rule out potential valid reasons for ‘submaximal’ performance before we rule-in or label the performance as ‘self-limiting’ or an ‘invalid effort?’

Evidence-based practice, while important, may not be the only indicator of a credible opinion. The touchstone of credibility for a physician has been described as deliberative, not waiting for “conclusive, or even published and peer-reviewed, studies to make diagnoses to a reasonable degree of medical certainty...”⁸ Reasonable medical certainty has been generally defined as being supported by a preponderance of the evidence, which is just enough to tip the scales, more probable than not.⁹ Therefore, an opinion may be credible without relying on research evidence if the clinical reasoning process was applied in a deliberative analytical way. Where the research is misapplied or is not relevant to a particular patient’s case, I would argue that reliance on the research lessens our credibility. Unfortunately, I’ve seen PT’s formulate opinions based on research that is not selectively applied to the individual patient in lieu of the diagnostic process. The opposite extreme is the PT who hesitates to put a definitive opinion in writing because they do not trust their diagnostic

abilities. If our clinical reasoning process is analytical and deliberative, we should be able to confidently rely on it when formulating opinions that have ‘reasonable medical certainty’ even where there is insufficient research evidence.

We can learn important lessons from the courts as we strive for recognition by the outside world as an autonomous doctoring profession. First, we need to document our diagnostic processes to show that we considered all sources for the PT problems. We must be careful about how much we rely on exams done by other professionals without performing our own exams. We must rule-in our diagnosis through an ongoing analysis instead of throwing the interventions at the dart board to see what sticks. Then through our deliberative process, which includes re-examination and follow-up, we must be confident that our conclusions are at least 51% accurate (more probable than not for a reasonable medical certainty). Research may lend credibility but documenting our differential diagnostic process and clinical reasoning skills is the key to our success!

Gwen Simons is a lawyer and physical therapist in Portland, Maine. She teaches in the entry-level and transitional-DPT programs at the University of New England. She can be reached at gwen@opta-maine.com.

² See *Westerberry v. Gislaved Gummi AB*, 178 F.3d 257 (4th Cir. 1999).

³ See *Cooper v. Smith & Nephew, Inc.*, 259 F.3d 194 (4th Cir. 2001).

⁴ See *Turner v. Iowa Fire Equipment Co.*, 229 F.3d 1202 (8th Cir. 2000).

⁵ *Supra* n. 2.

⁶ See Richard J. Flinn, Charles A. Alfonzo, and Rohit A. Sabnis, *Good Diagnosis Gone Bad? Medical Causation and Differential Diagnosis*, Tort Source (A publication of the Tort Trial & Insurance Practice Section of the American Bar Association), Vol. 8, No. 4, Summer 2006.

⁷ See *Supra* n. 1 for a detailed discussion on the rules of evidence for various tribunals.

⁸ See Brian C. Murchison, *Treating Physicians as Expert Witnesses in Compensation Systems: The Public Health Connection*, 90 Ky. L.J. 891 (2001/2002). (quoting the Heller Court’s recognition of other factors that “suffice for the making of a differential diagnosis even in those cases in which peer-reviewed studies do not exist. . .” including experience with patients, attendance at conferences and seminars, taking a detailed history and performing a thorough physical exam. *Heller v. Shaw Industries, Inc.*, 167 F.3d 146 (3d Cir. 1999).

⁹ See Jeff L. Lewin, *The Genesis and Evolution of Legal Uncertainty about “Reasonable Medical Certainty,”* 57 Md. L. Rev. 380, (1998).

PRESIDENT'S MESSAGE

Stephen Paulseth, PT, DPT, SCS, ATC

It is hard to believe that another Combined Sections Meeting is just around the corner in February. The Foot and Ankle SIG is pleased to offer you excellent programming in Boston. There will be a preconference course in collaboration with the Massachusetts Chapter entitled, Manual Therapy Techniques for the Foot and Ankle Complex: A Hands-on Laboratory and Clinical Application Course. The first day will involve a new foot classification system for foot type. The second day will involve the manual therapy component. Our Friday afternoon programming at CSM will be 4 one-hour presentations concerning ankle instability. Several experts will be discussing case studies, current evidence, evaluative and treatment information. The day will conclude with our SIG Business Meeting where drinks and snacks will be served. This is an excellent opportunity for you to have a voice in the SIG and the future path as a foot and ankle clinician, researcher, or anyone who has an interest in this area. I encourage you all to attend and bring a friend!

The Orthopedic Section Board of Directors and Committee Chairs along with the SIG Presidents recently met in La Crosse to work out the strategic plan for the Section. No doubt there will be a tremendous amount of information coming your way outlining this plan and its implications. I am sure that each of you will be pleased with our efforts.

I wish all of you Happy Holidays and a fruitful, productive, and healthy New Year. I look forward to seeing you at CSM!

INTERPRETING SCORES FROM SELF-REPORTED OUTCOME INSTRUMENTS

*RobRoy L Martin, PhD, PT, CSCS
Duquesne University, Pittsburgh, PA*

Self-reported outcome instruments used to assess the effect of treatment intervention for individuals with foot and ankle pathology continue to become more popular. If these instruments are to be useful, evidence must be made available to support the interpretation of the obtained scores. A scheme to help critically review instruments for their potential usefulness has been outlined.¹ Evidence for validity, reliability, and responsiveness should be available in order to properly interpret obtained scores. Additionally, the methods used in studies to offer this evidence must be evaluated so that the clinician can determine how their conditions compare to the study conditions.

When interpreting changes in score of an outcome instrument over time, evidence for reliability and responsive is needed. The instrument's score stability over time is defined as test-retest

reliability. It is assessed by having an individual complete the instrument at least 2 times over a period of time when the individual's condition is not expected to change. While intraclass correlation coefficients (ICC) are commonly provided, they offer little information for clinical interpretation. The minimal detectable change (MDC) can be a more useful measure as it represents actual changes in score that are associated measurement error over time.² The difference between obtained scores over time must be greater than the MDC in order to be confident that a score has truly changed.

While reliability can define measurement error over time, responsiveness is associated with the ability of the instrument to detect changes in an individual's status over time. The information obtained from studies using receiver operating characteristic (ROC) curves can assist with clinical decision making regarding an individual's change in status. A cut-off value in the change score that best discriminates between those that have improved from those that have not improved can be determined. A construct of change is the means used to demonstrate that change has in fact occurred.³ The cut-off value is referred to as minimum clinically important difference (MCID).⁴

The methods of data collection and test conditions for studies that offer evidence for responsiveness and reliability need to be considered. These methods would include information about the subjects' characteristics, timing of data collection, and construct of change.¹ The study conditions must be similar to those in the clinical environment the instrument is to be used in if the results are to properly interpreted and MDC and MCID values are to be properly applied.⁴ The Foot and Ankle Ability Measure (FAAM) and Lower Extremity Function Scale (LEFS) are instruments that have provided MDC and MCID values.⁵⁻⁷ The MDC values can only be applied over periods of time similar to that described in the research. For example, the MDC of 9 points on the LEFS is likely to correspond to a change score outside of measurement error when treating individuals with acute ankle sprains over a one week interval.⁵ Similarly, MDIC values are only interpretable in reference to the construct of change described in the study. For example, it would be likely that a patient would perceive themselves as improved after 4 weeks of physical therapy if they had a score change of 8 points or greater on the FAAM Activities of Daily Living subscale.⁷

Self-reported outcome instruments are only as useful as the evidence available to support their use. Particularly, values for MDC and MDIC may be valuable to allow for the interpretation of obtained scores on an instrument over time. Instruments should be investigated not only to determine the evidence for score interpretation but also the conditions associated with studies that offered this evidence.

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PRESIDENT'S MESSAGE

Joseph A. Kleinkort, PT, MA, PhD, CEAS, CIE, DAAPM

This will be my last message to all who have supported the Pain SIG for the last 6 years. I exit knowing that our new slate of officers will continue to forge ahead in the area of Pain Management and take us to new and significant heights in relation to clinically being able to address pain through the complexities of physical therapy. There are many new advances that assist the therapist in addressing the complex and often lonely field of Pain Management. The various nuances challenge us to reach for new and uncharted waters in the area of ways to address the pain patient. We must look toward the future with a firm grip on the past so that we can keep a steady course in our advancement.

I wish to give thanks to the staff and the Board at the Orthopaedic Section as well as the editorial staff for all of their hard work in support of our SIG over the years. Without their help, we couldn't have been where we are today. Also, I give my profound thanks to all who served with me through both terms and helped make this group what it is today. I leave knowing that we are striving toward great heights in what we can do to modulate pain and return our clients to function. We have come a long way but also we have so far to go. It is incumbent upon us to continue to work in a multidisciplinary field to provide the greatest support that we can to individuals suffering from chronic pain.

Most importantly, I want to thank each member for all your support and encouragement over the years. I would challenge each of you to reach to new heights in your quest to become all that you can be for your patient and yourself. It is that striving courage to seek new challenges that makes us all the very best that we can be. And finally I wish to close with these words...

"Someday after man has mastered the winds, the waves, the tides, and gravity...we shall harness all the energies of LOVE, and then for the second time in the history of the world man will have discovered FIRE!" Teilhard de Chardin

SEX DIFFERENCES IN PAIN PERCEPTION

Marie Hoeger Bement, PT, PhD

Clinical and Experimental Behavioral Studies

Sex differences are present in a number of musculoskeletal disorders. Such differences may include prevalence, symptom presentation, and treatment response. For example, disorders such as fibromyalgia, migraines, and temporomandibular pain are more prevalent in women. The increased incidence of pain extends to the work environment. For instance, in computer users, women are more likely than men to develop musculoskeletal symptoms and disorders of the upper extremity.¹ Thus, women may be at a greater risk than men in developing pain.

Sex differences in pain perception are also present in the laboratory setting. Women report higher pain ratings, lower tolerance, and lower threshold than men with experimentally-induced pain. These differences are dependent on the outcomes measured (intensity, threshold, or tolerance) as well as the type of stimulus applied.² Sex differences are more evident when measuring threshold or tolerance using a pressure or electrical stimulus, whereas the differences are not as consistent when measuring thermal threshold.

Treatment response may differ between men and women. Several studies have shown sex differences in pharmacological interventions, such as activation of the opioid system.³ Less is known regarding the potential for sex differences in nonpharmacological interventions. Koltyn and colleagues have shown that women are more likely than men to experience reductions in pain following static contractions.⁴ Furthermore, women are more likely than men to try certain types of pain management interventions such as relaxation and massage, with women deriving more benefits from cognitive therapy.⁵ More research is needed to elucidate the influence of gender differences specific to musculoskeletal disorders and interventions that incorporate physical therapy.

Potential Mechanisms

A number of theories have been put forth to explain sex differences in pain perception. This article will briefly review some of the most studied mechanisms. For example, there are distinct physiological differences between men and women. Women tend to have a higher percentage of body fat, higher cerebral blood flow, lower blood pressure, lower body weight, and slower renal clearance.⁶ Specifically, these physiological differences may explain the sex differences demonstrated in pharmacokinetics.

One of the more obvious differences between men and women is hormone status. Specifically, acute hormonal fluctuations associated with the menstrual cycle may influence how women perceive pain. A meta-analysis disclosed that women present with higher pain thresholds with a noxious stimulus of pressure, heat, ischemia, or cold pressor during the follicular phase than the luteal phase.⁷ Thus, sex differences in pain perception are more likely to occur when women are tested during the luteal phase of the menstrual cycle. However, not all studies demonstrate this change in pain perception across the menstrual cycle. These inconsistencies are likely due to the methodology employed.⁸ Sherman and LeResche reported a number of issues that should be addressed when studying the affect of the menstrual cycle on pain perception. These include the following: the population studied (age, users of contraceptives, pain status), type of pain stimulus (thermal, electrical, ischemic), sample size (power issue), definition of phase, evidence of hormonal state (body temperature, ovulation kits), and outcomes measured.

Less is known regarding the influence of the menstrual cycle in individuals diagnosed with a pain condition. Women with fibromyalgia, rheumatoid arthritis, and healthy controls all reported less positive affect during the luteal phase.⁹ Women with fibromyalgia and rheumatoid arthritis reported less positive affect than the controls. Conversely, Macfarlane and colleagues found that there was no association between pain symptoms and sex hormonal factors in women with chronic widespread pain.¹⁰ The role of acute hormonal fluctuations is likely a factor for some women in the perception of pain, although the exact mechanism is not known.

Sex differences in pain may also be explained by variations within the central nervous system. Cerebral activation studies show that sex differences are present both in the areas activated and in the amount of activation during noxious stimulation. After the application of a noxious thermal stimulus, women reported higher pain intensity and had greater activation of the prefrontal cortex compared with men.¹¹ Moulton and colleagues also examined cerebral activation with a noxious thermal stimulus; however, the stimulus was based on each subject's pain tolerance.¹² When men and women report similar pain intensities, women had less activation in the somatosensory cortex I, midanterior cingulate cortex, and dorsolateral prefrontal cortex.¹² Similarly, in individuals with irritable bowel syndrome, men had significantly greater regional activation following rectal stimulation than women.¹² Thus, differences in cerebral activation occur between men and women with and without a pain condition.

In addition to changes in cerebral activation, men and women exhibit differences in temporal summation which is centrally mediated. Temporal summation is the progressive increase in pain with repeated application of a noxious stimulus given at the same intensity each time. Following repeated application of a noxious mechanical stimulus, women had greater temporal summation (ie, more pronounced pain intensity and unpleasantness) than men.¹⁴ Robinson and colleagues attribute this increase in temporal summation to gender role stereotypes and anxiety.¹⁵ This increase in temporal summation is evident in women with fibromyalgia; women with fibromyalgia exhibit greater temporal summation than women without fibromyalgia.¹⁶ This increase in temporal summation suggests that women may have more hyperexcitability of the central nervous than men when exposed to a noxious stimulus.

The mechanisms associated with the sex differences in pain needs further investigation. There does not appear to be one dominant hypothesis but rather multiple systems that influence how men and women perceive pain. In both clinical and research settings, practitioners should be cognizant of the biological, psychological, and social factors that affect someone's pain event.

Animal Studies

Sex differences in pain perception are not exclusive to humans. Female rats have lower thresholds to electric shock than male rats.¹⁷ Acute hormonal fluctuations influence pain perception in that diestrus rats have higher thresholds to a noxious thermal stimulus than rats in proestrus.¹⁸ Furthermore, central administration of estrogen increased formalin-induced pain be-

haviors.¹⁹ Hence, animals present with sex differences that are similar to humans.

In addition to sex distinct pain behaviors, male and female animals present with differences in pain modulation. Similar to human subjects, sex differences are present regarding activation of the opioid system.²⁰ Furthermore, female rats experience less analgesia than male rats following various swimming stressors.²¹ In contrast to these findings, Mogil and colleagues found that the analgesia response is similar for swim stress-induced analgesia in male and female mice; however, the male response was mediated by both opioid and nonopioid systems whereas the females had an estrogen-dependent mechanism.²² Thus, in both humans and nonhumans, pain is modulated by factors that may be sex specific.

The animal model is advantageous because it mimics certain clinical conditions that are used to probe the mechanisms behind the development and maintenance of pain.⁵ Specifically, animal models are used to control the extent of injury, to examine the time course of injury, and to minimize the motivational affective component and placebo effects of treatment. The use of animal models circumvents the emotional issues and provides more control to study sex differences in pain.


Clinical and Research Issues

The influence of sex on pain perception in individuals with and without pain is not well understood. Additional research is needed to assess the sex differences in musculoskeletal diseases including symptom presentation, prevalence, and treatment response. Clinicians and researchers who are interested in sex differences should read the review by Becker, which addresses research guidelines for examining the sex differences in both human and non-human subjects.⁶ In this review, a series of experimental questions and specific recommendations are provided to help answer the persistent question of how sex influences the brain and behavior. Developing sex specific treatments, including both pharmacological and nonpharmacological prescription, will aid in managing certain sex dominant conditions more effectively. Thus, understanding the factors unique to male and female clients will strengthen the role of the physical therapist in treating individuals in pain.

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performingarts



SPECIAL INTEREST GROUP

DEAR PASIG MEMBERSHIP!

Looking Ahead!

This is the time of the year that always has everyone looking ahead as well as behind at what has happened in the previous year soon to pass. On a personal note, I would like to personally thank everyone for their prayers and good wishes sent to me in my hiatus as PASIG President due to my adventures with Hurricane Katrina and the aftermath. I have relocated to Pittsburgh, PA and my new contact information is located at the bottom of this letter. I would also like to thank all of the PASIG Executive Board and Committee Chairs for their tireless work on behalf of the PASIG, especially in light of my absence over the past year and a half. Special thanks and acknowledgement goes to Tara Jo Manal whom has had to serve not only as Vice President and Education Chair, but also acted as President in my absence. Thank you to all for all of your hard work!

I hope that everyone is well and is looking forward to the New Year and CSM 2007 with great anticipation. The Executive Board and Committee Chairs/members have been very busy working on many projects that everyone at CSM 2006 deemed as a priority. The main objective of the Board is to ensure that the work of the PASIG continues along the lines of the vision statement and the goals and objectives of the Orthopaedic Section in meeting the APTA Vision 2020. Strategic planning for 1-, 3- and 5-year objectives for the PASIG and its component committees was undertaken and presented to the membership at our CSM Business Meeting 2006 for their input and approval. It is now posted on the website and is available for membership discussion and modification. Please look ahead and plan to attend the Business Meeting following the educational program and join us for another great reception following the meeting!

The Membership Committee, under the chair of Julie O'Connell, is working to streamline the communication efforts to new members as well as present members and make sure all of the membership has an opportunity to understand the role of the various committees as well as join these efforts. Together with the Practice Committee, the goal is to update and establish a working list of mentors, affiliation sites, and therapists with various forms of expertise in the performing arts. Please do your part to keep us all informed of your practice and any changes to your personal information so we can keep this list as timely as possible. Information pertaining to membership can be found at our website: www.orthopt.org.

The Research Committee, under the chair of Shaw Bronner, has also remained very active in its efforts to bring a list-serve to the membership of timely performing arts related research and to broaden the commitment to helping members interested in clinical research within the PASIG. Members are urged to

contact Shaw regarding topics for the list-serve as well as willingness to help create one for the upcoming months of 2007. The Practice Committee is also actively working on information concerning the efforts towards creating a nationalized tool for dance screenings with the Dance USA program. They are continuing to look for help on their committee also in the areas of informing the membership on interstate licensing, practice issues, and updates. The strategic plans for both of these dedicated committees are listed on the website, and we welcome all of the memberships' comments and commitments to these important arenas.

Finally, the Education Committee, under the chair of Tara Jo Manal, has done another outstanding job in creating, designing, and producing the best programming for CSM 2007 in Boston. The topic will include aspects of clinical care for the performing artist in the area of the hip region. Please visit the website for all of the program listings and speakers as this information becomes available. In addition to preparing the programming for CSM, a First Responder Course with emphasis for the performing arts was also conducted in September, 2006.

The results of the Student Scholarship Program for CSM 2007 will be announced soon. The deadline for submission was November 1st, 2006. Looking ahead, if you know of any students interested in research in the performing arts, they can be eligible for a scholarship to attend CSM 2008 if their research is accepted at CSM and then submitted to the PASIG for consideration.

Thank you again to all whom make this organization so dynamic and please look ahead and see where you can join us in making an even better PASIG in 2007. Caring for the Arts brings out the best in all of us!

Susan C. Clinton PT, MHS, OCS
PASIG President
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 412-322-2494
 504-975-6779

CSM 2007 PERFORMING ARTS SPECIAL INTEREST GROUP FRIDAY FEBRUARY 16TH 1-5 PM

Evaluation, Rehabilitation and Medical Management of the HIP Joint Through the Lifespan of the Performing Artist – An Evolving Art

Description: The purpose of this course is to explore the evidence surrounding the evaluation and treatment of problems in the hip joint. The course will include a review of medical screening and red flags as they relate to the pediatric and adult

hip and differential diagnosis of hip pain in the performing artist. Sources of hip pain from tendon, bone, muscle, to capsular laxity, femoral-acetabular impingement, and chondral lesions will be discussed. Issues regarding diagnostic imaging, injections, relevant pharmacological agents, and surgical procedures and postoperative rehabilitation will be presented. Case presentations throughout the course will be provided to reinforce and expand on topics covered in the main program to include: injection in an in-season national level figure skater, management of labral tears, and clinical ideas for the performing artists with hip degeneration.

Level: Multi Level

Objectives: Following this presentation the participant will be able to:

1. Identify signs and symptoms related to pathology of extra articular and intraarticular hip dysfunction.
2. Understand the diagnostic validity and expected outcomes for patients with acetabular labral tears and/or femoral-acetabular impingement.
3. Recognize the need and understand the role of diagnostic tests and invasive and noninvasive medical procedures in the management of lumbar and sacroiliac pain.
4. Prepare a rehabilitation program for a performing artist with hip dysfunction, including return to artistic activity progression.

Friday February 16th 1-5 PM

1:00-1:30 LIVE- Hip Evaluation and Clinical Decision Making on a Dancer
Michelina Cassella, PT

1:30 – 2:20 Differential Diagnosis of Hip Pain in the Performing Artist
RobRoy L. Martin, PT, PhD, CSCS

2:20-3:20 Nonoperative and Operative Management of Hip Pathology in Performing Artists
Pierre D’Hemecourt, MD

3:20-3:40 Management of Rectus Femoris Tendonitis in an Elite Figure Skater
Tara Jo Manal, PT, DPT, OCS, SCS

3:40-4:40 Postoperative Management of the Hip in the Performing Artists- An Evolving Art
Keelan R Enseki, PT, MS, OCS , SCS, ATC, CSCS

4:40-5:00 Clinical Pearls of Rehabilitation of Hip Pain and Labral Tears in Dancers
Heather Southwick, PT, MS

5:00 – 6:00 PASIG Business Meeting

6:00-7:30 Reception

UPDATE ON THE TASKFORCE ON DANCER HEALTH

The Task Force on Dancer Health is a multidisciplinary team of physical therapists, physicians, and athletic trainers currently working with professional dance companies. At the request of the Manager’s Council of Dance/USA, the Task Force on Dancer Health has been working with DanceUSA to develop an annual post-hire health screen for professional dancers.

This was done at the request of the Manager’s Council of Dance/USA.

Although some professional dance companies have previously performed medical and/or impairment based screening exams, this was the first year that multiple companies performed the same screening exam.

The Task Force on Dancer Health was co-chaired by Mickey Cassella, PT and Heather Southwick, PT. This calendar year physical therapists at Alvin Ailey, Boston Ballet Company, and Pittsburgh Ballet Theater completed the pilot screen. Completion of the screen included reviewing the results with dancers individually and making recommendations for improvements based on the screening results. The screen was presented most recently at the annual International Association for Dance Medicine and Science.

Future goals of the screening exam are to increase the number of participating companies, increase the database for normative impairment based data in dancers, and to determine effectiveness of the screen in decreasing injury rate in participating companies.

If you have any questions regarding this project, please contact Erica Baum Coffey at baumeb@upmc.edu.



**APTA Performing Arts
Special Interest Group**

ATTENTION STUDENTS DID YOU GET ACCEPTED FOR PRESENTATION AT CSM 2007?

All student members of PASIG who have had their abstract accepted for CSM are invited to apply for a scholarship for CSM 2007 worth \$400. The topic must be related to performing arts and physical therapy to be considered for the scholarship. Find more information on CSM 2007 at <http://www.apta.org/Meetings/CSM>.

HOW TO APPLY:

1. Must be a member of PASIG. If you are not a member of

PASIG go to www.orthopt.org to learn how to join (it is free for members of the Orthopaedic Section).

2. Must have had an abstract accepted for presentation at CSM 2007 (deadline was July 15, 2006).
3. Once your abstract is accepted, contact the PASIG to apply for the scholarship. You must show proof of your abstract acceptance to CSM 2007, and plan to attend CSM 2007.
4. **Deadline for applying for PASIG scholarship was November 1, 2006.** Criteria for Scholarship selection is below.
5. Contact Leigh A. Roberts, DPT, OCS Chair of the Student Scholarship Committee, at Lar@LarPT.com or 410-381-1574 for more information.

PASIG STUDENT SCHOLARSHIP CRITERIA

Purpose:

To recognize students for their contribution to performing arts medicine and to assist in defraying the cost of attending the Combined Sections Meeting (CSM).

Eligibility:

1. Must be a student in an accredited physical therapy program when the research was conducted.
2. Abstract has been accepted to CSM.
3. Must attend CSM.
4. Must be listed as an author on the presentation.
5. Must participate in presenting the poster/platform.
6. Deadline for submission is November 1st of the year preceding the CSM for which the scholarship is being offered.

Criteria for selection:

1. The importance of the contribution of the abstract to the physical therapy management of performing arts physical therapy.
2. The clinical implications derived or suggested from the abstract
3. The quality of the writing.
4. The clarity of the clinical information/data presented.

Notification of the Award:

The recipient of the award will be notified in December (of the year preceding the CSM for which the scholarship is being offered) by the PASIG Scholarship Chairperson.



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HELLO TO ALL!

I hope this finds you well. We're nearly to the end of an exciting year of growth for the Animal Physical Therapy Special Interest Group and about to embark on an even more exciting future.

I hope that all of you have participated in the 2007 Orthopaedic Section and APTSIG elections. Our officers and committee chairpersons have much responsibility to our membership and are anxious for your input and volunteer assistance with upcoming projects.

Recently, APTSIG members lectured at a number of important professional conventions and symposia. These include the American College of Veterinary Surgeons Symposium in Washington, DC and the International Symposium for Physical Therapy and Rehabilitation in Veterinary Medicine in Arnhem, The Netherlands in October 2006. APTSIG officers and committee chairs in attendance at these meetings also met to discuss other issues of importance to the APTSIG membership.

We have been in frequent contact with our international counterparts and have begun the initial process of forming an international organization for physical therapists and assistants in animal rehabilitation. Our eventual goal is recognition as a subgroup of the World Congress for Physical Therapy (WCPT). We will be sure to keep you updated on this progress.

The APTSIG Strategic Plan has been approved and is being implemented, as you can see by the buzz of activity within the SIG. We will re-evaluate the Plan and our progress so far at our Business Meeting at CSM 2007 in Boston, Massachusetts.

We have initiated an official Practice Analysis to define and determine the role of the physical therapist in animal rehabilitation in the United States. Many of you will be invited to participate in this Analysis as we ask you to complete surveys and interviews. Our goal is to complete this Analysis in approximately 2 years.

The Orthopaedic Section has given its approval in our movement towards establishing a *Journal of Animal Rehabilitation*. We are currently in search of co-editors (a physical therapist and a veterinarian), an editorial board, and reviewers. We hope to 'publish' our first issue in 2009. I'm certain that you'll hear more regarding this effort in the near future.

Our education committee chairperson, Gina Epifano, has an exciting program planned for CSM 2007 in Boston, Massachusetts. Our programming and business meeting are scheduled for Thursday February 15, 2007 and will include presentations on canine orthopaedics, sports medicine, and rehabilitation by Sherman Canapp, DVM, DACVS and Laurie Edge-Hughes, PT, as well as your APT-SIG executive committee. We hope to see you there!

Till we meet at CSM!

Anie Lamoreaux Hesbach, MSPT, CRP
rehab@forpawsrehabilitation.com

MANUAL THERAPY EXPERIENCES

Steve Strunk, PT

Long ago, a childhood friend told me the reason her father bought a dog for her and her brothers was to teach them the attributes of compassion, kindness, and caring. Albert Schweitzer wrote that true ethical behavior has as a foundation reverence for all life. Someone whom I consider a hero of modern times, Jane Goodall, credits her childhood canine companion, Rex with inspiring her to study animal behavior. Undoubtedly many people choose career paths influenced by their experiences with and love of animals; perhaps many of you. So it was for me as well.

My first experiences in manual therapy techniques were practiced by intuition in my early teens during the mid-'60s, treating my dog Tippy, a very active male Border collie/beagle mix. He had a propensity for throwing himself out of whack, requiring attention for various sprains/strains, and other physical maladies. To sooth his conditions, I developed techniques that I would later come to know as soft tissue and joint mobilization/manipulation.

In the mid-70s, I began studying Yoga for stress reduction. Some of the stretches from Yoga and some I created were adapted into a routine for treating my dog, including 'downward facing dog.' These were combined with manual techniques, involving controlled motion very similar to therapeutic applications I would later learn of and those that continue to be developed and studied.

A whole new world opened up to me when I began studying Tai chi chuan (Taijiquan) in the late '70s. This included not only interest in other Chinese martial arts and physical culture, but forms of bodywork including Moshou, Anmo, Tuina, acupressure, and Japanese cousins Anma and Shiatsu, energy work including Chi Kung (Qigong), and other aspects of traditional Chinese medicine. I incorporated some of the manual therapy into treatment of my pets. In addition, the slow, balanced weight shifting movements of Tai chi proved invaluable in treating one of my dogs that developed ataxia. This involved manual contacts similar to what I would later learn and study more in depth as PNF and NDT.

My greatest joy, first as a PT student and now as a practicing PT, is to learn new manual techniques. Naturally, as soon as possible, I practice whatever I have learned on my animal friends. Some of my favorites come from the teachings of osteopathic manual medicine. I find the exaggerated, indirect, and direct techniques applicable to the spectrum of somatic dysfunction from acute, subacute, to chronic. Also, perhaps attributable to my studies of mind-body medicine, I continue to combine the esoteric with the research-based as representative of the art and science, respectively, of manual physical therapy. The result is what my great friend Mike Marks, PT refers to as 'certified eclectic.'

COMMENTARY*Steve Strunk, PT*

Current reports state that rehabilitation is the fastest growing area of veterinary practice. This is easy to understand as it was virtually nonexistent when the APTSIG was formed over 8 years ago. In large part, the formation of this SIG brought attention to this neglected aspect of veterinary medicine, and its officers and members have directly contributed to this growth. However, while veterinary medicine has benefited tremendously, as with almost all growth and change there has been controversy and resistance at certain levels.

The reported concerns by members were that it would make physical therapy generic, in certain respects, prescient. Many newspaper, magazine, and journal articles report on the beneficial 'physical therapy' treatment of animals. However, upon scrutiny, in most of these cases the 'physical therapy' is provided by non PTs. In fact, a few state veterinary practice acts have been amended to include 'physical therapy' as a practice domain for any veterinarian and his/her staff. In these states, since practice with animals is not within the scope of physical therapy, physical therapists may not provide physical therapy for animals. This leads to the confusing situation that veterinarians may provide physical therapy, but PTs/PTAs may not, even when working legally as veterinary aides, assistants, or techs.

Close to home, within about a 30-minute drive, a veterinarian and one of her techs who have completed one of the certification courses, have advertised their 'physical therapy' services provided by their 'physical therapist,' the tech. About a 5 minute drive away, a veterinarian who is attending another certification course is telling her clients she is studying 'physical therapy.' A 10 minute drive away, another veterinary rehab facility has started; however, they refrain from using the terms endemic to our profession and state their services are provided by 'rehab vet techs.' Meanwhile, the doomed proposed collaborative practice I described in my initial introduction, ie, with my friend a dog breeder/trainer and his veterinarian, is no more legal now than it was over 11 years ago. Not far from the building we were planning to use for our practice, a dog wash facility is installing an exercise pool and underwater treadmill.

We all need to be stewards and guardians of our profession. I have reminded non PTs in different forums that the certification courses are not programs in 'physical therapy' and they are not 'physical therapists' upon being awarded their certificate. I am a strong proponent of professional education specific to licensed physical therapists in animal practice, as established in other countries and endorsed there by both veterinarians and physiotherapists. My belief is that the highest standard of practice is collaboration between veterinary medicine and physical therapy on a professional level. And I remain an advocate for constructive changes recognizing qualified PTs and PTAs as providers of professional physical therapy services for animals.

THE USE OF FLUOROSCOPY IN ORTHOPAEDIC SURGERY*Sherman O. Canapp Jr., DVM, MS
Diplomate ACVS***WHAT IS FLUOROSCOPY**

The science of fluoroscopy (x-ray imaging during surgery) is

not new--in fact it has been in use since the early 1900s. Today fluoroscopy is widely accepted as an important anatomical guide used during minimally invasive and microscopic procedures, as well as many types of diagnostic tests. Fluoroscopy is the standard guidance modality for most percutaneous musculoskeletal interventions in humans, including long bone fractures, spinal fusions, and bone biopsies due to its good temporal resolution, excellent bone-tissue contrast, and real-time imaging. The use of advanced fluoroscopy has also improved the accuracy of incisions and hardware placement, minimizing tissue trauma while using a minimally invasive system. Increasingly procedures requiring the use of fluoroscopy are being developed.

ADVANTAGES AND DISADVANTAGES

The use of fluoroscopic techniques in veterinary patients offers a number of advantages compared to more traditional therapies. These procedures are minimally invasive and can therefore lead to reduced perioperative morbidity and mortality. Fluoroscopy entails less disruption of the periarticular soft tissue since most implants are placed through 0.5 cm stab incisions or mini approaches. Decreased soft tissue disruption leads to less pain, reduced blood loss, and less chance of infection. In most cases, return to use of the limb is quicker because of less surgically induced pain. Minimally invasive surgery techniques reduce the length of hospital stay, decrease hospital and anesthesia charges, and reduce anesthesia time. Some less equipment-intensive procedures can result in reduced costs as well.

The primary disadvantages of fluoroscopic procedures include the required technical expertise, potential radiation exposure, and the specialized equipment necessary. Radiation safety is a concern with the use of fluoroscopic imaging. The amount of radiation that the patient and surgeon are exposed to is a consideration, although it is more a function of surgeon experience with minimally invasive techniques. All studies recommend minimizing radiation exposure by wearing lead aprons, thyroid shields, glasses, and radiation-attenuating gloves. It was recommended that all personnel should stay 0.6 m from and never come into direct contact with the fluoroscopic beam when possible. Following these guidelines permits routine use of fluoroscopy with negligible radiation exposure. Another disadvantage of fluoroscopic procedures is that the equipment is expensive. Even though the price of fluoroscopy equipment is decreasing, one can easily spend \$40,000 – \$80,000 for the equipment and instrumentation. The amount of surgeon experience is by far the most important factor in operative times. Fluoroscopic guided orthopaedic procedures have a steep learning curve for the surgeon to build the necessary skills and experience. Fluoroscopy requires considerable practice, advanced hand-eye coordination, and needs to be performed on a regular basis to be performed proficiently.

EQUIPMENT AND TECHNIQUE

As most fluoroscopic procedures are minimally-invasive (performed through small holes in the skin), traditional sterile operating rooms are not required, but recommended. Most of these procedures are performed in clean orthopaedic or fluoroscopic suites. The entry sites receive a traditional sterile scrub, and operators wear full lead gowns, lead thyroid shields, caps, gowns, and masks.

The clinical application strongly influences the type of fluoroscopic equipment that is needed. At VOSM, Dr. Canapp has fluoroscopic machines dedicated to specific applications. The larger radiographic/fluoroscopic (R/F) system is used for procedures such as myelograms, epidurals, bone biopsies, and implant removals. The portable fluoroscopy unit 'mini c-arm' allows for easy adjustment between the lateral and ventrodorsal imaging positions. A mini C-arm fluoroscopy unit has the advantage of mobility of the image intensifier, permitting multiple tangential views without moving the patient. The mini c-arm is used for procedures such as closed reduction and external fixation of long bone and spinal fractures, treatment of angular limb deformities and distraction osteogenesis, spinal fusions, and assessment of intra-articular and periarticular implants. Fluoroscopic images are easily digitalized. The images are recorded on a hard drive and may be saved to a floppy disc or CD. Copies of these images can be printed out for a hard copy in the patient's record, as well as sent home with the owner and to the referring veterinarian.

It is recognized that not all practices or hospitals may be able to afford mini c-arm units. However, as surgeons further evaluate the costs and benefits of OR efficiency, ease of operation, reduction morbidity and hospital stay, and earlier return to function, that these units will become common place in most orthopaedic surgical facilities.

CURRENT VETERINARY APPLICATIONS

Despite potential applications in veterinary orthopedic surgery, and its common use in human orthopedic surgery, fluoroscopic techniques have not been widely adopted. Examples in the veterinary literature include reports of successful closed long bone and articular fracture reduction and fixation and closed spinal reduction and external fixation. At VOSM Dr. Canapp is currently using intra-operative fluoroscopy for the following procedures:

- Closed reduction and fixation of long bone and articular fractures
- Closed reduction and external fixation of spinal fractures
- Spinal fusion for Wobblers disease
- Guided bone biopsies
- Implant removals
- Corrective osteotomies/osteotomies:
 - Angular limb and growth deformities/distraction osteogenesis
 - Bone tumor limb spares/distraction osteogenesis
- Confirm implant placement or fracture reduction prior to closure (articular fractures or periarticular implants)
- Obtain postoperative images (no need to transport to radiology decreasing anesthesia time and excessive transport of the patient)
- Myelograms for intervertebral disc disease

Long Bone and Articular Fractures

Closed fracture reduction and external fixation has been well described in both veterinary and human literature. In one such study, by Johnson A et al, the effects of closed reduction and application of a type-II external fixator to comminuted fractures of the radius and tibia in dogs was evaluated. In this study all dogs healed with the original fixation device in place. Mean time between surgery and the development of bridging callus was 11.4

weeks (range, 4 to 22 weeks), and mean time between surgery and fixation removal was 14.7 weeks (range, 4 to 27 weeks). The conclusion of this study was that closed reduction and application of a type-II external fixator was an effective method of treating severely comminuted radial and tibial fractures.

A study by Dudley et al, compared open reduction and bone plate fixation with closed reduction and external skeletal fixation as treatment for severely comminuted fractures of the tibia. Results of this study found no difference in time to earliest radiographic evidence of bone healing between fractures treated with a bone plate and dogs with fractures treated with an external fixator. Dogs treated with an external fixator did, however, have shorter surgery times. Additionally, dogs treated with bone plate fixation was associated with more complications.

A recent study in the *Journal of Orthopedic Trauma* evaluated the use of intraoperative fluoroscopy during acetabular surgery to determine fracture reduction and accurate placement of screws. Results of this study revealed that intraoperative fluoroscopy confirmed the extra-articular position of all screws evaluated. Postoperative CT scans confirmed the extra-articular placement of all screws assessed by fluoroscopy. Quality of reduction using intraoperative fluoroscopic images had a 100% correlation with reduction on final radiographs. One patient, with 2 screws placed without fluoroscopic evaluation, had intra-articular placement requiring revision surgery.

Spinal Fractures & Fusions

Traditionally, vertebral body pin placement for spinal fractures has involved an open dorsal approach to the spine with reflection of the epaxial musculature. This leads to increased tissue trauma and potential destabilization of the spine by disruption of the supraspinous and interspinous ligaments resulting in greater postoperative morbidity. Fluoroscopically guided percutaneous placement of pins for stabilization of spinal fractures has been reported in human patients, and only recently in animals. This technique decreases the amount of tissue trauma dissection needed and lessens the degree of uncertainty involved in placing pins near the spinal cord and other vital soft tissue structures. When compared to an open approach, fluoroscopic vertebral pin placement provided better observation of the vertebral body, allowing more precise control over pin placement as well as decreasing the amount of tissue trauma caused by a standard open approach. The complication incidence was significantly greater in the open group for thoracic vertebrae. The results of that study suggests that a closed technique for placement of Steinmann pins in lumbar vertebrae for use in external skeletal fixation is a reasonable and safer alternative to the traditional open technique.

Other areas of spinal surgery where fluoroscopy has been demonstrated as beneficial is in spinal fusion for Wobblers disease. Not only does fluoroscopy allow for a more minimally invasive approach to the cervical spine it allows for more accurate screw placement, avoiding the potential disastrous effects of penetration into the spinal canal.

Angular Limb Deformity and Distraction Osteogenesis

Fluoroscopy is a valuable tool when correcting angular limb deformities and performing distraction osteogenesis. Treatment

of angular limb deformities typically requires a corrective osteotomy at the site of maximum deformity. Since the deformities are not simply one dimensional, and exists in 3 planes. Correction must account for realignment in all 3 planes with the use of fluoroscopic guidance the osteotomy can be performed accurately at the site of maximum deformity through a minimally invasive approach and the limb realigned under fluoroscopic guidance in all 3 planes.

Distraction osteogenesis is a technique which may be used to spread the bone (or bones) that have stopped growing (premature physal closure) or that have been excised due to neoplasia (limb spares). With the use of fluoroscopy the osteotomy/osteotomy can be performed accurately through a minimally invasive approach, the limb realigned, and the circular external fixator applied under fluoroscopic guidance in all three planes.

Bone Biopsy

When performing a bone biopsy for the diagnosis of bone neoplasia one common error is obtaining a core sample from the center of the lesion. Obtaining samples from this location can result in a histological diagnosis of reactive or necrotic bone requiring a second anesthetic episode and surgical procedure. To obtain the most accurate sample, the biopsy should be obtained from the periphery of the lesion. This can be difficult when obtaining samples blindly. With the use of fluoroscopy, the Jam Shidi needle can be guided to the periphery of the lesion decreasing the likelihood of a nondiagnostic sample.

CONCLUSION

In conclusion, it has been shown that fluoroscopy offers numerous advantages over traditional open approaches for the diagnosis and treatment of orthopaedic conditions. Dr. Canapp has received advanced training in fluoroscopic orthopaedic procedures and currently offers the all procedures listed above to his patients.

It is recognized that not all practices or hospitals may be able to afford fluoroscopy units. However, as surgeons further evaluate the costs and benefits of operating room efficiency, ease of operation, reduction in morbidity and hospital stay, and earlier return to function, that these units will become common place in most veterinary orthopaedic surgical facilities.

SUGGESTED READINGS

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