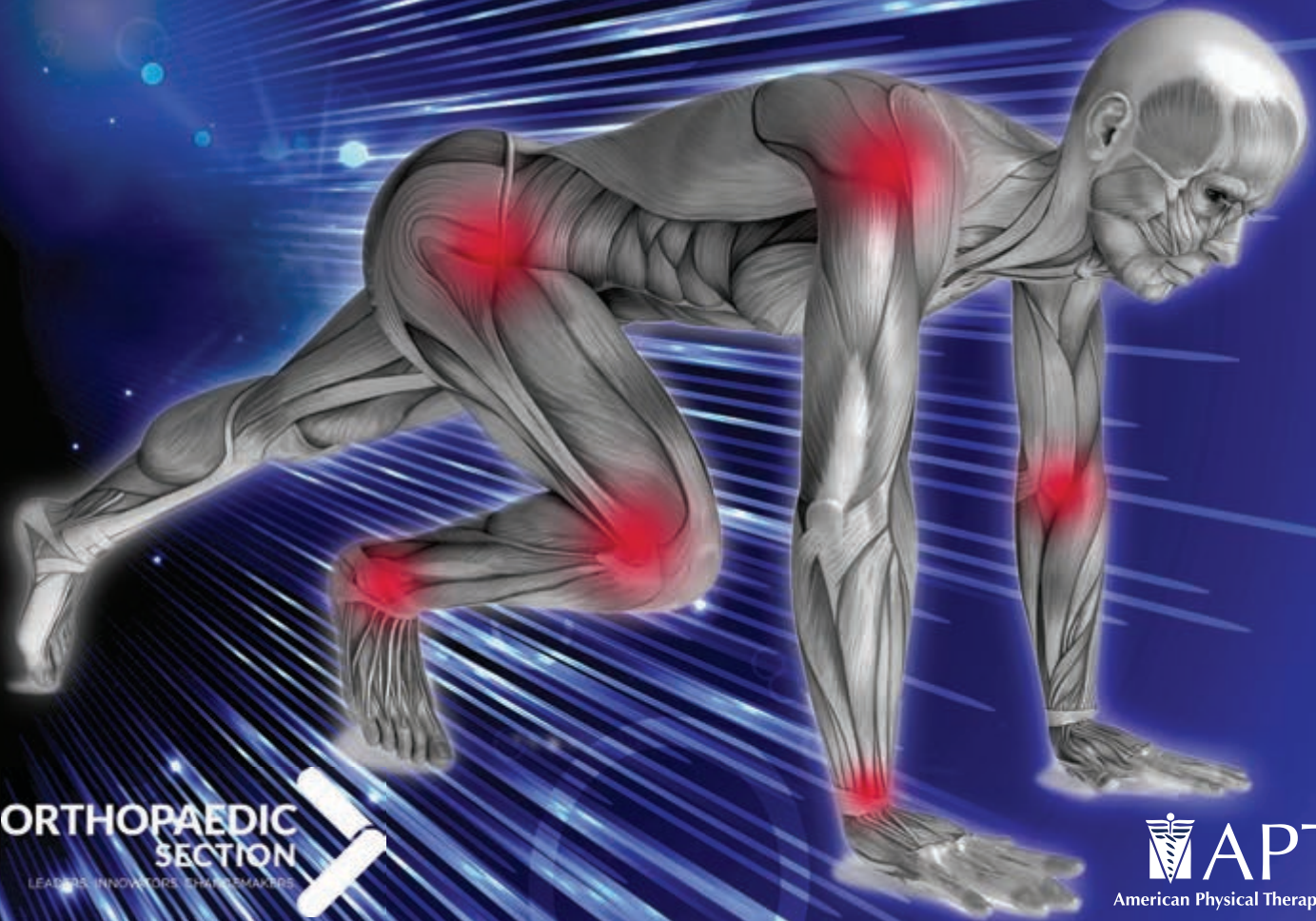


# ORTHOPAEDIC Physical Therapy Practice



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American Physical Therapy Association

THE MAGAZINE OF THE ORTHOPAEDIC SECTION, APTA

# ORTHOPAEDIC Physical Therapy Practice

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To serve as an advocate and resource for the practice of Orthopaedic Physical Therapy by fostering quality patient/client care and promoting professional growth.

### Publication Staff

#### Managing Editor & Advertising

Sharon L. Klinski  
Orthopaedic Section, APTA  
2920 East Ave So, Suite 200  
La Crosse, Wisconsin 54601  
800-444-3982 x 2020  
608-788-3965 FAX  
Email: sklinski@orthopt.org

#### Editor

Christopher Hughes, PT, PhD, OCS

#### Associate Editor

Rita Shapiro, PT, MA, DPT

#### Book Review Editor

Rita Shapiro, PT, MA, DPT

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 207-396-5165 • scfmpt@earthlink.net  
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**(608) 788-3982 or (800) 444-3982**

**Terri DeFlorian, Executive Director**  
 x2040.....tdeflorian@orthopt.org  
**Tara Fredrickson, Executive Associate**  
 x2030.....tfred@orthopt.org  
**Leah Vogt, Executive Assistant**  
 x2090.....lvogt@orthopt.org  
**Sharon Klinski, Managing Editor**  
 x2020.....sklinski@orthopt.org  
**Laura Eichmann, Publishing Assistant**  
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**Carol Denison, ISC Processor/Receptionist**  
 x2150.....cdenison@orthopt.org  
**Brenda Johnson, ICF-based CPG Coordinator**  
 x2130.....bjohnson@orthopt.org

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 Term OP: 2004-2019

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 gordonriddle@hotmail.com

**OP Associate Editor:**  
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 haxby.abbott@otago.ac.nz

**Executive Director/Publisher:**  
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 877-766-3450 • edithholmes@jospt.org

**NOMINATIONS**  
**Judith Woehrle, PT, PhD, OCS**  
 623-572-3921 • jwoehr@midwestern.edu  
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 414-288-3380 • guy.simoneau@marquette.edu  
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**ICF-based CPG Editor –**  
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 603-653-3565 • cmm@bu.edu

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 406-581-3147 • lpettet@aol.com  
 Term: 2016-2019

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 626-815-5020 ext 5072 • neolusonlyme@aol.com  
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 206-215-3176 • carolynmcmamus24@gmail.com  
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 Term:

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 608-406-6335 • matthaberl@yahoo.com  
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 402-280-5633 • kpeck@creighton.edu  
 Term: 2016-2019

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 404-712-1620 • kgeist@emory.edu

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 lsu73lsu73@yahoo.com



Yes, they go together, just like peanut butter and jelly or mustard on a hot dog. If you have practiced long enough in orthopaedics, you come to realize that the nervous system is as much a part of orthopaedic care as joint mobilization. Separating or ignoring the coupling leads to an inferior outcome. I am sure I am not the first one to understand the link, but it did take some experiences to appreciate it. The first time this happened, I was a physical therapy student working in a traumatic brain injury (TBI) unit for one of my affiliations. Prior to this event, I was orthopaedics and biomechanics all the way. I was too busy trying to understand torque, stress, strain, power, velocity, and accelerations. As a biomechanist, the standing joke was always why we reduced and analyzed images to headless stick figures! Because we really were only interested in mechanical concepts of kinematics and kinetics but gave little credence to the role of central pattern generators, neural networks, and the cognitive influences! It just made the model easier to understand. But it did not allow for total comprehension and appreciation of the movement dynamic, that is for sure! This myopic view can only take you so far especially when it comes to delving further into the therapy of movement, recovery, and function.

Unknowingly, even before my stint in the TBI unit, my previous graduate studies led to a similar orientation and enlightenment. This pertained to the latest research coming out dealing with the impact of loss of ankle proprioception on injury and recovery.<sup>1,2</sup> Research was teasing out the role of aberrant proprioception on functional instability and more importantly why it needed to be considered as a part of the rehabilitation process. Soon to follow was the same logic being applied to shoulder dysfunction. Research revealed that proprioception for glenohumeral and scapular stability were very dependent on training the nervous system and not just about getting patients stronger.<sup>3,4</sup> Ultimately, it was all about functional gain. Moving forward to the present, it is now commonplace to automatically consider the neural recovery needed for anterior cruciate ligament injury prevention and also its vital role obtaining a positive postsurgical

outcome and reduce the risk of reinjury.<sup>5</sup> Go even further and look at the role neural input plays in hamstring injury. We no longer believe that strengthening the muscle holds the key to injury prevention. We have to consider the neural drive.<sup>6</sup>

Working with a geriatric population? Then you have to fully appreciate the neuromuscular contributions to the age-related reduction in muscle power!<sup>7</sup> Lastly it is essential to understand you cannot expect full rehabilitation success for a patient with acute low back pain without understanding and addressing the neural factors.<sup>8</sup>

My thirst for understanding and appreciating nervous control on muscle action and movement was quenched by reading Dr Roger Enoka's book titled, *Neuromechanics of Human Movement* from cover to cover.<sup>9</sup> Research by Zajac and Gordon<sup>10</sup> on modeling of multi-articular movement also gave me a sense of how muscle action can affect joints they do not span. These resources provided perspective to look at the whole picture and not just the parts. Similarly, my experience in the TBI unit honed my observational skills and my understanding of motor control theory and the movement dynamic. Ultimately the neuro experience made me a better orthopaedic physical therapist. I often joke to my students that my neurological background is limited to the simple premise that nerves do not like to be compressed or stretched! Not so, I fully appreciate the movement dynamic and my treatments are all the better for it. The research has come a long way but there is still so much more work to be done to enhance our understanding of the neurological influence in orthopaedic care. No doubt advances in technology and even regenerative medicine and pain science will spearhead this leap forward. Ironically, you cannot help but wonder if we are doing ourselves a disservice by setting ourselves apart and claiming territory and niche areas by calling ourselves an orthopaedic specialist. Does this move us further away from understanding the movement system? Maybe that is why it is currently so hard to define it.<sup>11,12</sup>

Sometimes the more things change, the more they remain the same. In the end, I just want to be a skilled physical therapist. If that means putting all the pieces together

by being a closet neuro enthusiast but a card carrying member of the Orthopaedic Section, then so be it!

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**#114 Donatelli's Pathophysiology and Mechanics of the Shoulder with Lab by Robert Donatelli, Ph.D, PT, OCS**

May 12-13, 2017	Berlin, VT
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## Keep an eye out for these ICF Based Clinical Practice Guidelines publishing soon in *JOSPT*:

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- Knee Stability and Movement Coordination Impairments: Knee Ligament Sprain (Revision)
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## Great resources for Clinicians and Patients found here:

<https://www.orthopt.org/content/practice/clinical-practice-guidelines/patient-clinician-resources>

## All published Clinical Practice Guidelines posted here:

<https://www.orthopt.org/content/practice/clinical-practice-guidelines/published-guidelines>

## OMISSION

### Editor's Note:

In the last issue of *OP* was the article, *Manual Therapy, Therapeutic Exercise, and HipTrac™ for Patients with Hip Osteoarthritis: A Case Series* by John M. Medeiros, PT, PhD, and Tony Rocklin, PT, DPT, COMT.

A financial disclosure and conflict of interest were inadvertently omitted. The following statement should have accompanied the article.

Tony Rocklin PT, DPT, COMT, is a shareholder in the company MedRock, Inc which manufactures the HipTrac.

The editors regret the omission.

## POSTED MINUTES

2017 Orthopaedic Section minutes are now available on the Orthopaedic Section website at <https://www.orthopt.org/content/governance/meeting-minutes/meeting-minutes-2017>

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## Paris Distinguished Service Award Lecture

## Where Is The Practice of Physical Therapy Headed?

Steven R. Clark, PT, MHS, OCS



Thank you very much. This is a great honor for me. As grateful as I am for this honor, though, I keep asking myself one simple question. *What am I doing here?* The Paris Distinguished Service Award is a prestigious award due to those professionals who have received this award prior to me as well as the person for whom this award is named. Such recognition from fellow professionals whom I admire and respect is far beyond gratifying. I would like to thank Joe Donnelly who felt it appropriate to nominate me for this award and to Pam Duffy, Tom McPoil, Sandra Norby, and Tess Vaughn for their letters of support. I appreciate the time and effort the Awards Committee and the Board of Directors spent in their approval process for this award.

I want to give credit to those who have helped to direct my physical therapy professional path. At the top of the list would be my wife, Gloria, who is unable to attend tonight due to her own professional commitment as a member of the Board of Delegates for the American Occupational Therapy Association. Without her support, encouragement, and understanding my growth and development as a clinician, activity in the community, and service in the state association, APTA, and Section would not have been possible. We both believe giving back to our profession and our professional association is a responsibility not to be taken lightly. The Junior Chamber of Commerce, also known as the "Jaycees" service organization, has a motto that has always been important to me. That motto is, "Service to mankind is the best work of life." Service in whatever capacity provides an excellent opportunity to develop as an individual. I have always felt that I received more than what I gave through serving. Service allows the individual to develop lifelong relationships and promote employment, community, and professional organizations. I believe strongly that as a professional, we have the responsibility to serve mankind and should always keep in the back of our minds this is a privilege that is bestowed upon us by our educational choice.

It is interesting to note that in 1977, one other physical therapy student from my Mayo Clinic class and I attended the Min-

nesota state physical therapy annual meeting. What is it that drew us, two uninitiated students, to attend this meeting? I feel that our response can be summarized in these words, "Professional Responsibility." Early in my career, living in Des Moines, Iowa, I would attend district meetings, which included the western half of Iowa. I found out quickly that the same individuals were re-elected to office. New individuals had a difficult time breaking into this group. Therefore, when I moved to Sioux City, Iowa (now a 3-hour drive from Des Moines for our district meetings) another therapist, Gary Debner, and I became frustrated when we could not get elected into office for this Western district. After reviewing the state bylaws, we determined the best way to get involved was to develop a new district, which ultimately took place. Gary became the first NW district chair, as I had been asked to serve and accepted a position on the Iowa Physical Therapy and Occupational Therapy Board of Examiners. I subsequently served as the NW district chair and was then encouraged to move up through the office in the Iowa chapter. Out of all the positions I held, the position of Treasurer was nearest and dearest to my heart. It was due to my interest in financial management that Pam Duffy, Speaker of the APTA House at that time, recommended I put my name in for the APTA Finance Committee. Prior to receiving a call from APTA, I was contacted by the Orthopaedic Section asking if I would be interested in serving on their Finance Committee. I accepted the Section's Finance Committee position as I thought APTA had gone another direction having not heard from them. Shortly thereafter, I was contacted by APTA to join their finance team. In addition to these 2 new roles, I was the President-elect of the Adel-Desoto-Minburn booster club. Thus, in June 2002, I assumed 3 new roles to go along with my current role as Chief Delegate for the Iowa chapter. One rule of thumb for getting volunteer work accomplished is to find the busiest individuals. They will figure out how to balance their time and life to get the mission accomplished. That is also why there is a problem getting people involved in their professional organization. There is a tendency to keep going back and drinking

from the same well. We need to encourage and sometimes coax participation. It is only through this mechanism that we will maintain a strong organization and build leadership skills in others.

I am very proud of my efforts toward the professional development of others. When I taught at Des Moines University, I had the privilege of having the students in the first class of the curriculum – Human Motion I. At my choosing, the first part of this class was spent on professional responsibility and the need for participation in their professional organization with an emphasis on understanding they had no control over their future if they did not get involved. I tried to make it clear that if they were not involved, they had no grounds to complain about the outcome. I am very pleased that 3 of my former students have served the Iowa Physical Therapy Association as President and many others have served on the Board in various capacities. It is my belief that professional responsibility has to be engrained in the therapist's persona at the academic level. Additionally, I feel all universities should set the bar high for student and faculty involvement as role models. Students need strong mentorship to develop self-responsibility in this area. Once therapists are out in the work place, there are too many things in their life that take priority. Consequently professional service becomes less significant to them and is not likely to be considered if they did not have these experiences as a student.

It is interesting to note my path into orthopaedics did not start at graduation from physical therapy school. Initially, I was a neurologic-based physical therapist wishing to work with patients with spinal cord injuries. Who knows what my path might have been if I had found it easier to see this type of patient! Unfortunately, in 1977 at the rehab facility where I worked, the new therapists did not get the spinal cord patients. I was told I had to earn that privilege! My personality was such, as many of you have come to know that those comments did not

work well for me, therefore, I did not stay in that rehab setting for long. My first true transition to orthopaedics occurred due to my personal experience with a whiplash injury. I learned very quickly that I did not have much knowledge in this arena being a neurologic-based therapist, but I also became quite aware that my colleagues in Northwest Iowa knew even less than I did! Thus, the start of my orthopaedic career came about due to my own inability to progress successfully with rehabilitation. I struggled with the concept of chronic pain; thinking that I might be a malingerer, based upon recovery, believing my pain should have resolved but it did not. I tried to put this into perspective, as I had not missed any work, even though I was in a constant state of discomfort. I did treat a lot of patients while adorning ice to my neck or low back to make it through the day and frequently found my own physical limitations were greater than my patients for whom I was providing care. This experience, although initially negative and exhausting, became my catalyst to seek new knowledge and answers for me as well as my patients. I started to attend multiple educational courses in an effort to gain more advanced and in depth understanding about my own musculoskeletal condition and in the process developed skills that changed my professional journey. I have found in life, we do not always know where we are going to end up, but upon reflection, can see how unexpected and extremely challenging events can shape one's life.

The individual who directed my early path in orthopaedic skill development was Mark Bookhout, a classmate of mine as well as my roommate during our time at Mayo Clinic. Mark was always multiple steps ahead of me and would recommend educational activities that he perceived valuable in developing my skills. It was through his encouragement I attended my first spinal class under Dr. Stanley Paris and became interested in spinal care. Actually, this was my first awareness for spine specificity as the Mayo Clinic academic program taught low back care to consist of massage and Williams flexion exercises in the 1970s. Maybe that was why I was not very excited about spinal care upon my graduation!

The most interesting thing for me, having completed the Paris series believing Dr. Paris walked on water was that these techniques were effective in helping many of my patients, but not for all. Mark Bookhout then directed me into the osteopathic program at Michigan State University. This treatment approach

including muscle energy technique (or PNF contract relax for the spine as stated by Florence Kendall in conversation), myofascial release, visceral release, craniosacral therapy, functional therapy, and strain-counterstrain strongly directs my patient care today, perhaps due to my patient care emphasis on chronic pain. These treatment approaches have a specific format for looking at movement or lack thereof. I find these principles to be an asset to my practice even though some of these approaches remain controversial within the literature. I find when all the stars align in my physical therapy evaluation, these techniques and their approach to intervention are fantastic. The patient with chronic pain usually has multiple factors contributing to his or her condition, including surgeries as well as trauma – both physical and emotional according to Schoferman et al.<sup>1</sup> This necessitates a greater level of problem solving to adequately address the needs of this population who have often been told there is nothing more that can be done, and they often feel hopeless. This brings up one of my concerns with current rehabilitation. It seems we as a profession are trying to put all of our patients into one basket. While classification systems and prediction rules are great in theory, having been in the field for 40 years, I do not find that every case can easily or adequately be addressed with a restrictive system! Every patient with low back pain is not the same! Although, there are patient similarities, I am continually surprised to find the individual variances based on the patient's own personal history that directs patient care. Thus, one question I always have is, "Do we truly have a like treatment and control group for our research?" It is these yet unidentified variances that I feel directly contribute to the treatment interaction whether positive or negative when testing various interventions and techniques. Are we short-changing an important group of patients with chronic conditions because we have too narrow a focus or have not yet discovered the most salient variable that predicts patient response to treatment?

When I was teaching in the Des Moines University physical therapy program, I attempted to do research for 9 years on myofascial release therapy, which I find to be an asset in my intervention approaches. Based on the research, I am supposed to select a standardized treatment by choosing the one technique that I feel most appropriate for a positive treatment outcome based on the inclusion set of parameters for the study. Unfortunately, the variability I discussed pre-

viously introduced itself into these research projects. Patients may all present with low back pain but the cause can be different from one patient to the next based on anatomical involvement. A patient with low back pain can have symptoms that are generated by the joint, muscle, neural structures, ligamentous, dura, osseous as well as visceral somatic, and treatment should be applied appropriately. A single myofascial technique will not address these variables but the study parameters did not allow for variability of the myofascial technique as per research protocol. When I placed my hands on the patients, I was immediately aware that the chosen treatment intervention was correct or not. Patients receiving a myofascial application appropriate to their underlying presentation did well. Those patients for whom the chosen myofascial release technique was not appropriate to their underlying pathology did not have a positive response. Based on my research studies and decades of orthopaedic practice, myofascial release does not work as a single technique, but based on the individual patient outcomes, the approach does work for those for which it is applied appropriately as a sequential technique! Unfortunately, the research study protocol did not allow me to individualize the treatment intervention technique that was matched to the patient presentation. This treatment intervention is not applied as a one-time technique, but as multiple progressive activities to be built upon in the same session. If clinical research was done on myofascial therapy in the manner for which it is applied, I believe the outcome for the study would be positive. But, it could be argued the study was not specific and could not be reproduced due to this variability. However, that does not mean seeking the clinical evidence for techniques that cannot presently be explained or are difficult to define or reproduce should be abandoned. These questions and others should continue to be explored, especially in an era where physical therapists are being promoted as the first choice and an alternative to opioids for chronic pain. It is even more important now that we continue to seek the answers to these perplexing questions that have been with our profession for so many years.

I use physical therapy principles but find the manual therapy concepts and techniques promulgated by osteopathy to be of greater relevance in my practice. My primary goal is to get the patient better, and that means decreased pain, enhanced function, and self-management without medications. The techniques I have learned through a life of



professional development with colleagues such as Mr. Bookhout have allowed me to achieve outcomes I cannot attain with those in academic curricula or for which there is a randomized controlled, double-blind study. The human body is a sensory mechanism and as such, touch is a valuable adjunct for intervening in patient care. Central sensitization<sup>2</sup> in chronic pain patients suggests we need to be able to intervene into the patient's electrical wiring to facilitate change. Touch through manual intervention is one of the best methods for neural stimulation due to the significant number of receptors in the patient's skin to allow for this exchange. In addition, manual therapy creates and facilitates movement necessary for life.

Physical therapy has focused on evidence-based practice, which I do support. But I also believe that we should not throw the baby out with the bath water. Dr. Sackett's<sup>3</sup> evidence-based practice model is traditionally defined in terms of a "3-legged stool" integrating 3 basic principles: (1) the best available research evidence bearing on whether and why a treatment works, (2) clinical expertise (clinical judgment and experience) to rapidly identify each patient's unique health state and diagnosis, his or her individual risks, and benefits of potential interventions, and (3) client preferences and values.

When I view the Orthopaedic Section's approach to this 3-legged stool, I feel the stool is unbalanced or biased toward research, the first leg. I understand how evidence-based practice became paramount after an article in the *Wall Street Journal* where there was significant treatment variance reported. I understand the need for professional accountability and the need for practicing therapists to use the most efficacious interventions. However, there will always be practice variance based on individual clinician expertise, and client preferences. Also patient variance is the hallmark for those patients who have either been failed by the health care system or who are considered to have failed all the standard medical and physical therapy approaches. Evidence supported practice should not be a "cookbook" with recipes, but rather a sound application of therapy interventions based on research, knowledge of anatomy, physiology, and individual patient variances. I exhort all students and clinicians to continue developing their knowledge of functional anatomy and physiology and use those parameters to guide their practice with the inclusion of evidence.

I learned about patient context in my early days of practice in northwest Iowa. Remem-

ber this was nearly 40 years ago. Some therapists at the facility where I worked routinely applied hot packs and ultrasound for every patient. As many of you will recall, that was not too uncommon at that time. It was also what was taught in academic programs, and often physical therapists were seeing patients with a prescription and orders of a physician who stipulated hot packs and ultrasound would be done. I, being fully loaded with my Stanley Paris skills, set out to teach my colleagues in my new work setting that those modalities were not necessary. What I discovered was many of those patients, who had the modalities in prior treatment, demonstrated therapeutic benefit, and did not tend to respond to my manual skills and exercise instructions, unless the modalities were added. I must admit this experience was quite humbling.

I think we all agree we need to listen to our patients. We do need to know how and in what ways they have had a previous positive response to something the literature may question or when there is weak evidence to link their outcome. All physical therapists must be able to discern when, how, and in what dosage the various interventions available to us should be used to address individual patient needs to obtain the improvements described in the patient goals. We need to take the best available evidence, apply it to the patient's context, the state of tissue physiology and anatomy, consider functional limitations, and do what is right for the patient. The ultimate outcome is what is important, and using evidence in the appropriate context is critical.

I believe I have rambled on long enough, so will simply wrap things up by saying I see tremendous potential for the profession of physical therapy. I urge us as orthopaedic practitioners and as a Section to be very careful how we go forward. If we are not going to embrace some of the manual skills as well as procedures that provide positive CLINICAL outcomes in spite of the research evidence; then, we will allow those techniques to move to other health care practitioners which could make it difficult for long-term survival of physical therapy, especially in the area of chronic pain. I encourage us to embrace the roots of our profession in hands-on, manual, and humanist skills that are based on our unique knowledge of the human body. In addition, we must resist the extremes of only being evaluation specialists that eliminates appropriate use of manual therapies and relegates a group of patients in need of our services to lesser trained individuals because of a

lack of balance in the 3-legged stool.

Thank you again to the Orthopaedic Section for this service award and the opportunity to share my experiences.

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## Editor's Note

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# Differential Diagnosis of Shoulder Pain in a Postoperative Patient: Clinical Applications

Kristi Angelopoulou, PT, DPT, OCS, MCMT

Emory & Henry College, School of Health Sciences, Marion, VA

## ABSTRACT

**Background:** A 47-year-old male with unremitting left shoulder pain 5 months following arthroscopic subacromial decompression was referred to physical therapy with a diagnosis of sternoclavicular sprain.

**Findings:** The patient presented with musculoskeletal involvement of the left shoulder postoperatively. Of concern, was the intensity and description of pain, leading the therapist to further monitor and screen for atypical signs and symptoms. The patient developed shoulder pain while climbing stairs, prompting an immediate referral. Subsequent testing revealed 3-vessel severe coronary artery disease with associated angina pectoris.

**Clinical Relevance:** Due to the similarities in clinical presentation of musculoskeletal shoulder pathology and angina pectoris, the potential exists that there may be a masking of symptoms when more than one pathology is present. **Conclusion:** The physical therapist should be aware of presentation, progression, and response to treatment, which may reveal pathology not indicative of musculoskeletal involvement.

**Key Words:** angina pectoris, medical screening, red flags

## BACKGROUND

The role of a physical therapist as a direct access health care provider brings along with it a significant responsibility. Although physical therapists do not make medical diagnoses of pathological conditions as a part of the evaluative process, they must be able to identify pathological conditions that are not consistent with musculoskeletal and movement impairment diagnoses.<sup>1</sup> Whether a patient accesses a physical therapist directly or they are referred from another health care provider, the physical therapist must decide whether: (1) physical therapy intervention is appropriate for the patient; (2) consultation with another health care practitioner is required along with physical therapy intervention; or (3) physical therapy intervention is not indicated and the patient should be managed by another health care practitioner.

This clinical decision making process is based on the patient history and physical examination findings that are consistent with pathology which requires physician consultation and examination.<sup>4</sup> Ross and Boissonnault<sup>4</sup> state that there is currently a lack of evidence describing which signs and symptoms are representative of specific pathological conditions, thus challenging the physical therapist. The purpose of this case study is to help clinicians to identify and screen for angina pectoris in patients presenting with shoulder pain.

In the United States, coronary heart disease (CHD) is the leading cause of death.<sup>5,6</sup> One out of every 6 deaths is attributed to CHD, which causes myocardial infarctions as well as angina pectoris. Estimates are that 10,200,000 people in the United States suffer from angina, and an estimated 500,000 new cases of stable angina occur each year.<sup>5,6</sup> Angina afflicts 58% of patients with coronary artery disease (CAD).<sup>7</sup> Twenty-five percent of all patients with angina will suffer a myocardial infarction within 5 years and 50% of those over 45 years of age develop a complicating myocardial infarction within 8 years.<sup>8</sup>

Classical angina, first described by Heberdon, is a common symptom in patients with CHD and refers to the typical chest pressure or discomfort that results when myocardial oxygen (oxygen supply) demand rises and coronary blood flow is reduced by fixed, atherosclerotic, obstructive lesions.<sup>7,8</sup> Angina pectoris represents a visceral pain caused by reversible myocardial ischemia.<sup>9</sup> The physiological nature of this referred pain, which occurs as a result of myocardial ischemia, is still being investigated.

Typical angina lasts between 2 and 10 minutes and may be triggered by increased activity, emotional stress, cold, wind, and/or fever.<sup>7</sup> The discomfort of exertional angina is relieved by rest within 1 to 5 minutes, or more rapidly, with sublingual nitroglycerin. Classically, there is heaviness or pressure retrosternally, with possible radiation to the ulnar aspect of the left arm, neck, jaw, mid-abdomen, right arm, or shoulders.<sup>7</sup>

The average frequency of anginal attacks

in patients is about 2 per week.<sup>7</sup> The pattern of referred myocardial pain varies among individuals in intensity and duration. Eslick<sup>10</sup> has identified 4 distinct chest pain locations associated with acute coronary syndrome, which include upper chest, central retrosternal, central chest, and left chest and left arm. In his study, there was considerable location/symptom overlap between patients who had cardiac chest pain and those who had non-cardiac chest pain.<sup>10</sup> The number of patients presenting with chest pain eventually found to have CAD ranged from 11% to 39%. Of those patients with chest pain seen in emergency rooms, about 45% to 50% will have a cardiac etiology with the remaining 50% to 55% diagnosed with non-cardiac chest pain.<sup>7</sup> In a study performed by Miller et al,<sup>11</sup> 2.8% of patients presenting to the emergency room with chest pain and given a non-cardiac diagnosis, had an adverse cardiac event within the next 30 days. This degree of overlap in clinical presentation and location of the pain, presents a challenge to clinicians who are faced with differentiating pain of cardiac and non-cardiac origin. Because angina often precedes infarction, early diagnosis is critical.<sup>12</sup> It is therefore imperative that physical therapists medically screen all shoulder, neck, and thoracic pain patients for the possibility of underlying pathology, whether as the primary source of pain, or as co-morbidity to an existing musculoskeletal disorder.

## DIAGNOSIS

### History

The patient was a 47-year-old male who was referred to physical therapy by his orthopaedic surgeon 5 months following an arthroscopic procedure to his left shoulder. His presurgical MRI revealed acromioclavicular capsular hypertrophy with moderate to severe impingement of the rotator cuff. Similarly, plain radiographs identified narrowing of the acromioclavicular joint. Subsequently, he underwent arthroscopic subacromial decompression of the left shoulder. Following his surgery, he continued to have left shoulder pain with an onset of intermittent severe pain closer to the sternum. The patient

decided to visit his primary care physician due to concerns that it may be his heart. His primary care physician determined his pain to be inflammatory in nature, placed him on a steroidal dose pack, and referred him back to the orthopaedic surgeon. Upon follow-up with his surgeon, he reported having clavicular pain that was exacerbated by taking deep breaths. He had point tenderness over the left sternoclavicular joint, full range of motion of the shoulder, and a negative horizontal adduction test. Plain radiographs revealed an adequate resection of the left lateral clavicle. He was diagnosed with sprain of the sternoclavicular joint and was referred to physical therapy.

Upon presenting to physical therapy for initial evaluation, the patient reported he thought he may have injured his shoulder while playing with his son because he could not remember doing anything else that may have aggravated it. He reported he visited his primary care physician who ruled out any cardiac condition, and also he had seen his surgeon who referred him to physical therapy. He reported that since the injury, he had difficulty taking a deep breath and he was unable to return to his prior level of function. His pain with activity was rated 7 out of 10 on the visual analog scale (VAS) and rest reduced his pain to 1 out of 10. The pain, he reported, was so bad at times that he thought he was having a heart attack.

The patient reported no past medical history or complications on his intake and review of systems, and the only medication currently being taken was Paxil. His past surgical history also included a prior arthroscope to the right shoulder for impingement syndrome with complete resolution of the pain. The patient was identified as having a Type I acromial configuration with mild anterior downward sloping orientation leading to his bilateral chronic impingement syndrome.

### Physical Examination

Upon physical examination by the physical therapist, the patient was noted to have significant elevation, upward rotation, and protraction of the left scapula, with decreased scapular mobility. There was hypertonicity to the left upper trapezius and levator scapulae insertion and the patient was extremely tender to palpation over the sternoclavicular joint. A trigger point was located with deep palpation of the levator scapulae referring pain to the neck and the patient had sternoclavicular pain upon deep inspiration. There was no tenderness to palpation over the acromioclavicular joint or the glenohumeral

joint. Bilateral glenohumeral joint range of motion was within normal limits and pain-free. He had mildly diminished cervical range of motion in all planes and tightness of his left pectoralis major with decreased horizontal abduction range of motion. There was glenohumeral inferior capsular restriction on the left as compared to the right as detected by an inferior glide.

Based on the evaluation, the physical therapist diagnosed the patient with impaired joint mobility, motor function, muscle performance, and range of motion associated with localized inflammation and joint arthroplasty. This working diagnosis was concluded due to the musculoskeletal and mechanical involvement of his left shoulder postoperatively defining the working diagnosis and the rationale for treatment and skilled intervention. The therapist had some concerns based on the intensity and subjective severity of the patient's pain. Since the patient had no relevant past medical history and had been screened and cleared by his primary care physician, the clinical decision was made to proceed with treatment, but with continuous screening for further evidence that may indicate pain of non-musculoskeletal or cardiovascular origin (Table 1).

### Intervention

Intervention was initiated and included stretching and manual techniques for improving mobility of the upper trapezius, levator scapula, and pectoralis major. The patient received trigger point therapy, as well as manual contract-relax techniques to resolve muscular shortening. The patient also received cold low level laser therapy over the sternoclavicular joint, and a home exercise program. After 3 visits, the patient reported some improvement in his overall symptoms. The therapist however noted that the patient fatigued easily with active exercises, and used compensatory patterns of scapular elevation

to accomplish shoulder flexion. Upon initiation of the fourth visit, the patient reported having a few really bad days. He was out of town at a conference, and reported that while he was walking up a flight of stairs, he developed very sharp chest pain, which he described as debilitating. The therapist noted that this type of chest pain, which came on with physical exertion not related to his shoulder, was not consistent with a musculoskeletal origin, nor was it consistent with the working diagnosis made for shoulder involvement. An immediate referral was made for the patient to see a cardiologist for follow-up of his symptoms and physical therapy was discontinued at that time.

Within days, the patient was seen by a cardiologist and underwent a stress test followed by heart catheterization, which revealed 3-vessel severe CAD. He was diagnosed with coronary artery disease, unstable angina, and hypercholesterolemia. Two weeks following the physical therapists' referral, the patient underwent coronary artery bypass graft surgery.

### DISCUSSION

This patient case illustrates the clinical importance of how continuous monitoring of patients' symptoms and response to intervention can raise serious clinical concerns during the course of treatment that were not apparent at the time of the initial assessment. Although the patient did have musculoskeletal involvement in the shoulder and upper quarter, he also had a co-existing condition of CAD that had not been previously diagnosed. It is likely the CAD produced angina in the left chest and shoulder, which was masked by postsurgical and soft tissue impairment. Because of the potential to misdiagnose the true origin of shoulder pain, the physical therapist should compare any presentation, progression, and response to treatment to that of typical shoulder problems.<sup>13</sup> There is a

**Table 1. Signs and Symptoms that Warrant a Referral to a Physician. Adapted with permission from Duvall.<sup>3</sup>**

Dizziness
Shortness of breath or difficulty breathing
Swelling without a history of injury
Pain or a feeling of pressure in the chest
Pain that pulsates in a body region
Unchanging and severe pain in the lower leg or arm
Discolored or painful feet

significant degree of overlap in the symptoms of cardiac and non-cardiac related shoulder pain, making this diagnosis very challenging, especially with this patients' surgical history (Table 2). In addition to the overlap in presenting symptoms, it has been shown when referred pain persists for a period of time, it can lead to local and isolated musculoskeletal changes that can mimic an orthopaedic condition.<sup>13</sup> Whenever pain is referred to the shoulder from sources outside the musculoskeletal system, the potential exists for palpation tenderness at the site of pain referral. When referred pain to the shoulder has been present for several weeks, areas of referred pain may also be accompanied by underlying changes to musculoskeletal tissues.<sup>13</sup> In this case, the therapists' initial suspicion based on the patients' descriptors of his pain were key in the successful monitoring of the patient during future visits.

The subjective component of the examination has been shown to be an extremely effective tool for identifying pain of cardiac origin.<sup>7,8,14-17</sup> Although the history is extremely important in identifying angina symptoms, there is conflicting evidence about the history and components that are most useful. Swap and Nagurney<sup>18</sup> found that chest pain characteristics increase the likelihood of acute coronary syndrome or acute myocardial infarction included pain that radiates to one or both shoulders or arms or is precipitated by exertion. Shoulder pain that increases with physical exertion unrelated to shoulder activities is suggestive of symptoms from the myocardium.<sup>12,18</sup> Conversely, characteristics that decrease the likelihood of pain of myocardial origin include pain that is stab-

bing, pleuritic, positional, or reproducible by palpation.<sup>18</sup> Exertional pain, pain radiating to the shoulder or both arms, and chest wall tenderness are useful in differentiating myocardial vs nonmyocardial origins of pain.<sup>10,19</sup> Exertional chest pain is a strong indicator for major coronary risk.<sup>20</sup> There are several typical characteristics of stable angina that should increase the likelihood of underlying CHD. These include: type of discomfort (tight, dull or heavy), location (often retrosternal or left side of chest and can radiate to left arm, neck, jaw, or back) relation to exertion (brought on by exertion or emotional stress and eased by rest), duration (typically the symptoms last up to several minutes after exertion or emotional stress has stopped), and other factors (may be precipitated by cold weather or following a meal).<sup>21</sup>

When studying how patients subjectively describe their angina, Jones et al<sup>15</sup> found while some patients described their symptoms in narratives consistent with typical anginal symptoms, others offered more complex descriptions of their experiences, which were more difficult to classify. The latter was particularly the case for severe CAD, where some patients tended to downplay chest pain or attribute their experience to other causes. The predominant features described by some patients are discomfort and heaviness or breathlessness, not pain.<sup>21</sup> Although certain elements of chest pain history are associated with increased or decreased likelihoods of a diagnosis of acute coronary syndrome, none of them alone or in combination identify a group of patients that should be cleared without further diagnostic testing.<sup>18</sup> In the case presented, the patient described pain with

attempting to take a deep breath, exertional pain that was unrelated to shoulder activity, and severe chest pain, which are all consistent with a myocardial origin. The clinical picture in women is different enough from men that it can obscure the correct diagnosis,<sup>22</sup> thus therapists' should be aware of the differences in clinical presentation (Table 3).

Glenohumeral and acromioclavicular joint involvement can refer pain to a number of areas in the upper quarter, including along the clavicle and down the arm.<sup>13</sup> When comparing pain of intrinsic and extrinsic sources in the shoulder, there are a number of characteristics that should be considered including palpable pain, pain which increases or decreases with activity, rest or positioning, and whether or not the pain can be reproduced or provoked by the patient or clinician. Recognizing how symptoms developed, their change in location, their intensity with certain movements or rest, their changes with posture, whether the pain is constant or intermittent, aggravating factors, nighttime pain, alleviating factors, and non-musculoskeletal activity provide the therapist with valuable data for effective medical screening as related to the differential diagnostic process.<sup>3</sup> Of particular clinical significance in this case, shoulder pain that increased with physical exertion unrelated to shoulder activity was suggestive of symptoms from the myocardium.<sup>13</sup>

An important part of the medical screening process is assessing patients for cardiovascular risk factors. Based on decades of research through the Framingham Heart Study, they have developed a set of predictors for CHD to include age, gender, diabetes, smoking, blood pressure, total cholesterol,

**Table 2. Differentiation of Symptoms of Musculoskeletal and Myocardial Origins**

Symptoms	Musculoskeletal Origin	Myocardial Origin	Patient's Presentation
Pain located in shoulder, clavicle, down arm, chest, neck, and/or jaw	X	X	X
Pain that is described as severe, crushing, breathlessness*		X	X
Pain can be provoked by special testing or positioning	X	X†	X
Palpable tenderness	X	X†	X
Local and isolated musculoskeletal adaptive changes over time	X	X†	X
Pain is brought on by exertion and relieved with rest	X	X	X
Shoulder pain that increases with physical exertion, but is unrelated to shoulder activity (ie walking up stairs)*		X	X
Symptoms last up to several minutes after exertion	X	X	X
Patient shows progress with intervention	X	X†	X
* Indication for an immediate referral			
† Indicates that this is a finding when musculoskeletal involvement co-exists or referred pain has persisted for a prolonged period of time			

**Table 3. Differences in Clinical Presentation between Women and Men with Coronary Heart Disease<sup>22,24-26</sup>**

Women typically have a delayed onset (years of age)
Women are less likely to experience chest pain than men
Women are more likely to have atypical symptoms including:
Non-exertional chest pain
Pain in the jaw, arms, shoulder, back, and epigastrium
Dyspnea, palpitations, presyncope
Abdominal pain
Nausea
Fatigue

and low density lipoprotein (LDL) cholesterol. Based on these factors, a 2-year and 10-year prediction can be made for the risk of heart disease.<sup>23</sup> The American Heart Association<sup>5</sup> lists the following risk factors for developing CHD: age >65, gender, heredity, smoking, elevated cholesterol, elevated blood pressure, physical inactivity, obesity/overweight, and diabetes.

There are a number of classification systems for angina that exist. One useful and applicable to the physical therapy setting is the Canadian Cardiovascular Society Grading of Angina Pectoris.<sup>21</sup> This system classifies angina into 4 categories and lists functional activities that are associated with each. The NICE guidelines (National Institute for Health and Clinical Excellence) recommends the presence or absence of the following 3 factors should be noted: a constricting discomfort in the front of the chest, or in the neck, shoulders, jaw, or arms; the discomfort is precipitated by physical exertion; the discomfort is relieved by rest or nitroglycerin within about 5 minutes. If all 3 factors are present, the symptoms should be classified as typical angina, two factors atypical angina, and one or none of these factors non-anginal chest pain.<sup>16</sup>

## CONCLUSION

This case is an example of how musculoskeletal pathology can mimic, co-exist, and/or mask myocardial referred pain. This scenario can possibly lead to a delayed referral and medical diagnosis. Physical therapists have a very unique role in the health care team, which allows direct observation of the patients' response to intervention over a period of time. Whether the patient is referred to physical therapy from another health care provider or they are being treated through

direct access, it is essential that physical therapists be able to identify various pathologies and differentiate them from musculoskeletal or movement-related dysfunction when deciding if physical therapy intervention is appropriate. The physical therapist's extensive and frequent follow-up with patients provides an excellent opportunity to identify features and changes in the patient's clinical status that may suggest pathology outside the scope of physical therapy practice.

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# The Immediate Effects of Kinesio Taping Versus Thoracic Manipulation in Subjects with Mechanical Neck Pain: A Pilot Study

Brynn Blickenstaff, SPT<sup>1</sup>  
Jenae Perman, SPT<sup>1</sup>  
Ashley Rojan, SPT<sup>1</sup>  
Robert Boyles, PT, DSc, OCS, FAAOMPT<sup>1</sup>

<sup>1</sup>University of Puget Sound, School of Physical Therapy, Tacoma, WA

## ABSTRACT

**Study Design:** Pilot study. **Objectives:** To examine the short-term effects of Kinesio Tape (KT), when applied to the cervical spine; on pain, disability, rating of change, and cervical range of motion compared to thoracic spine manipulation (TSM) in individuals with mechanical neck pain (MNP). **Background:** Recent studies support TSM as an effective intervention for patients with a primary complaint of MNP. Kinesio Tape is an increasingly popular intervention for clinicians treating patients with MNP. However, no studies have investigated the immediate effects of TSM compared to KT in subjects with MNP. **Methods:** Eleven participants presenting with a primary complaint of neck pain who met inclusion criteria were randomly assigned to one of three treatment groups: TSM and exercise (TSM-EX), KT and exercise (KT-EX), or a strictly exercise (EX) control group. All participants received their intervention twice across 2 consecutive weeks with a follow-up appointment on the third week. Outcome measures collected at 1 week, 2 weeks, and 3 weeks included: Numeric Pain Rating Scale (NPRS), the Neck Disability Index (NDI), and the Global Rating of Change (GRC). **Results:** KT-EX and TSM-EX groups showed a trend of decreased NDI and NPRS scores each week. The EX group showed a decrease in NDI and NPRS scores between baseline and week 1. All groups showed improvement in symptoms on the GRC all weeks except week 2 for the EX group. **Conclusion:** This pilot study demonstrates the need to further investigate the effects of KT compared to TSM in patients with MNP. Currently, we are unable to report significant differences between treatment groups due to the low power of this study. However, KT-EX and TSM-EX groups demonstrated superior results in all outcome measures compared to the EX group.

**Key Words:** Kinesio Tape, mechanical neck pain, thoracic spine manipulation

## INTRODUCTION

Manual physical therapy is an effective and appropriate intervention in the management of neck pain.<sup>1-3</sup> The *Guide to Physical Therapist Practice*<sup>4</sup> uses the term mobilization to refer to a “manual therapy technique comprising a continuum of skilled passive movements to the joints and/or related soft tissues that are applied at varying speeds and amplitudes, including a small amplitude/high velocity therapeutic movement.”<sup>4</sup> The term “joint mobilization” is used to describe passive techniques performed at low velocity, whereas the term “joint manipulation” is used to describe passive techniques involving higher velocity, low amplitude thrusts.<sup>5</sup> Although these manual techniques are commonly used by physical therapists to treat neck pain, the specific joints targeted, as well as the sequencing of manual interventions, remains variable. Due to the biomechanical relationship between the cervical and thoracic spine, known as regional interdependence, disturbances in joint mobility in the thoracic spine may be an underlying contributor to the development of neck disorders.<sup>5,6</sup>

Evidence has been published regarding the use of thrust manipulation procedures directed at the thoracic spine level for the management of pain in the more superior cervical area.<sup>7-10</sup> Cleland et al<sup>7</sup> examined the effects of thrust versus non-thrust techniques directed at the level of the thoracic spine. The results from the study indicated that thoracic spine thrust manipulation contributed significantly greater short-term reductions in pain and disability than thoracic non-thrust mobilization in patients with neck pain.<sup>7</sup>

Additionally, Flynn et al<sup>8</sup> reported increased cervical range of motion (ROM) and reduced pain immediately after thoracic spine manipulation (TSM) in patients with primary neck dysfunction. The TSMs used by Flynn et al<sup>8</sup> consisted of high velocity, low amplitude thrusts, however, thus far, explanations for this remain hypothetical.

Another intervention used clinically in the management of patients with mechanical neck pain (MNP) is Kinesio Tape (KT).<sup>9-15</sup>

Kinesio Tape was originally developed in Japan by Kase,<sup>9</sup> and has become increasingly popular in recent years. Kinesio Tape is a thin, pliable adhesive material that can be stretched up to 120% to 140% of its original length, making it more elastic than conventional tape.<sup>10</sup> It has been hypothesized that KT may exert its effects by (1) increasing local circulation; (2) reducing local edema by decreasing exudative substances; (3) improving circulation of blood by facilitating the muscle; (4) providing a positional stimulus to the skin, muscle, or fascial structures; (5) providing proper afferent input to the central nervous system; or (6) limiting ROM of the affected tissues.<sup>12</sup>

Although physical therapists regularly use KT in clinical practice, a systematic review by Parreira et al<sup>16</sup> reported the application of KT revealed the same results as a placebo treatment. A few published case reports have suggested that KT may be beneficial in treating acute patellar dislocations,<sup>13</sup> trunk pain,<sup>15</sup> and myofascial pain.<sup>11</sup> More recently, two randomized clinical trials have suggested that KT may be effective for the treatment of shoulder pain<sup>14</sup> and acute whiplash.<sup>12</sup> In patients with shoulder pain, KT immediately improved painfree active shoulder ROM but did not change pain or disability.<sup>11</sup> In individuals with acute whiplash, the application of KT slightly improved pain and cervical ROM.<sup>12</sup> Nevertheless, changes in these two studies were relatively small, which may indicate that the effects of KT are limited.

In addition to the aforementioned clinical interventions, evidence suggests that home exercises, combined with or without manual therapy, can be beneficial for patients with nonspecific chronic neck pain.<sup>17</sup> In a recent systematic review on exercise for the management of neck pain, research depicted that combined programs including strengthening, ROM, and flexibility were effective for the management of persistent neck pain.<sup>18</sup> A study by Chiu et al<sup>19</sup> also found short-term benefits with improvement in pain and disability when a neck exercise program is instituted in patients with chronic neck pain.



To date, no study has evaluated the effects of TSM compared to KT alone in patients with mechanical neck pain. The purpose of this study is to compare the short-term effects of TSM and exercise versus cervical spine KT and exercise versus exercise alone on pain, disability, rating of change, and ROM among subjects with mechanical neck pain.

## METHODS

### Participants

Participants for the study were recruited to participate through a flyer posted throughout Tacoma, WA, at various coffee shops, grocery stores, local businesses, as well as at the University of Puget Sound from February 2015 through April 2015. Interested participants were screened by phone for the following inclusion and exclusion criteria. Participants were eligible if their neck pain was exacerbated with movement, were between the ages of 18 and 40 years old, and able to complete a questionnaire written in English. Participants were excluded if their symptoms were suggestive of a non-mechanical etiology, presented with contraindications or confounders such as unexplained night pain, unexplained weight loss, numbness and tingling in the arms and/or legs, balance or coordination problems and morning stiffness lasting greater than one hour, a history of whiplash injury within 6 months of treatment, spinal manipulation therapy or KT application within the past 6 months, diagnosis of osteoporosis, symptoms suggestive of nerve root compression, prior cervical or thoracic spinal surgery, or pending legal action. The Institutional Review Board (IRB) of the University of Puget Sound approved the study protocol. All subjects signed an informed consent prior to participation in the study.

### Study Protocol

The study was conducted from February 2015 to April 2015. Nineteen possible participants were screened according to the established inclusion and exclusion criteria with 11 meeting criteria for participation. Participants who were eligible for the study were scheduled for 3 appointments, once weekly for 3 consecutive weeks (day 1, day 7, and day 14) (Figure 1). Participants were instructed not to receive any outside care for their neck pain while participating in the study. Demographic data including age, gender, medical history related to their neck pain, as well as location, nature, and duration of their neck symptoms were collected (Table 1). Outcome measures used throughout the

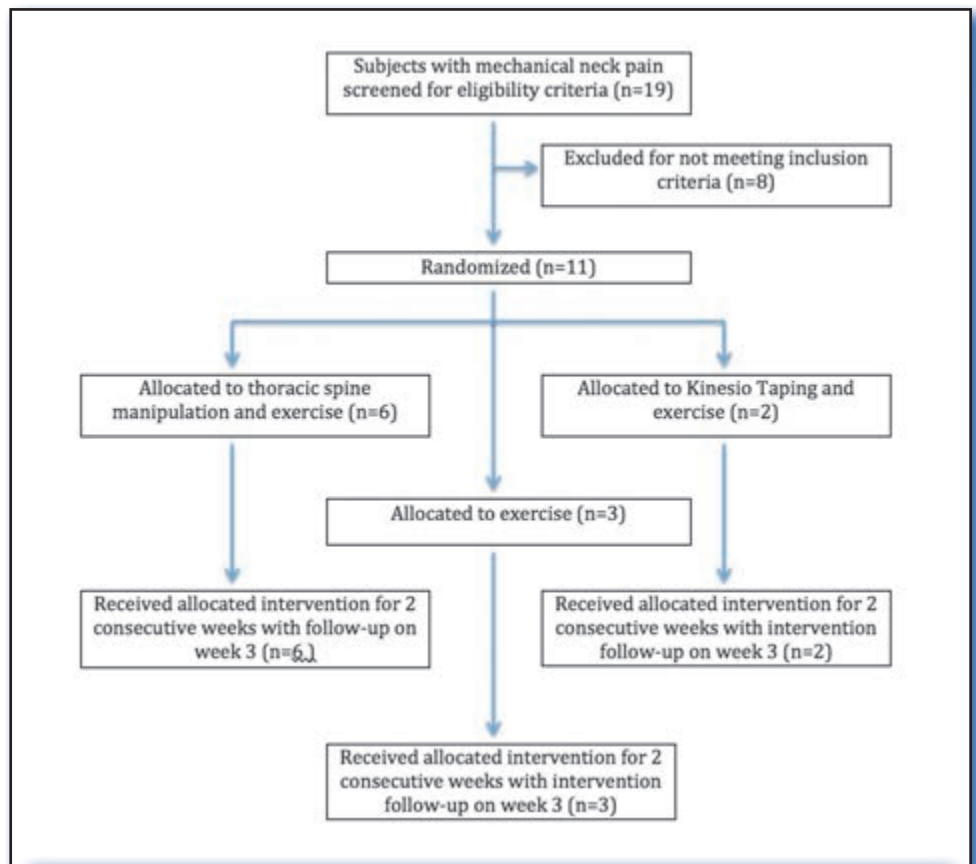


Figure 1. Flow diagram of subject recruitment and intervention allocation.

Table 1. Baseline Demographic for All Subjects in All Treatment Groups

Variable	KT-EX (n=2)	TSM-EX (n=6)	EX (n=3)
Age (y)	20	24.3 ± 5	24 ± 6
Sex (female)	1 (50%)	4 (67%)	1 (33%)
Symptom duration (d)	60 ± 42	248 ± 105	430 ± 578

Abbreviations: KT-EX, Kinesio Tape and exercise; TSM-EX, thoracic spine manipulation and exercise; EX, exercise

study included Neck Disability Index (NDI), Numerical Pain Rating Scale (NPRS), Global Rating of Change scale (GRC), and cervical ROM measurements of flexion, extension, bilateral side bend, and bilateral rotation. The NDI consists of 10 questions regarding functional activities such as lifting, personal hygiene, reading, work, driving, sleeping, and recreational activities as well as pain intensity, concentration, and presence of headaches. Responses can be rated on a scale from no disability (0) to complete disability (5) with a total score ranging from 0 to 50, higher scores corresponding to greater disability.<sup>20</sup> The NDI has been used frequently in other studies investigating the disability level of cervical dysfunction including whiplash-associated disorders.<sup>10,12,20</sup> The minimal

clinically important difference (MCID) is a change of 19%.<sup>21</sup>

The NPRS is a pain scale rating the participants' pain level from no pain (0) to maximum pain (10) and was used to record the participant's neck pain level pre- and post-intervention. The NPRS has been validated and found to be reliable.<sup>21-23</sup> The MCID is a change of 1 point or 15%.<sup>21</sup> The GRC is used to quantify a patient's improvement or deterioration over the course of an intervention session and/or time. The GRC has been validated and found to be reliable.<sup>24,25</sup> The MCID is a change of 3 points.<sup>24</sup> The GRC was used to quantify the participants' change in symptoms prior to the intervention to immediately postintervention.

Cervical ROM was taken preintervention

as a baseline by the administering researcher with the participant in a seated position using an inclinometer for cervical flexion, extension, and bilateral side bend, and with a goniometer for bilateral cervical rotation. Inclinometer and goniometer have been found to be valid and reliable tools for ROM measurement.<sup>26</sup> Cervical ROM was taken postintervention by the treating researcher to allow the administering researcher to remain blinded to the intervention given. Postintervention, the participants again completed an NDI, NPRS, and GRC to establish short-term effects of the given intervention.

### Treatment Protocol and Application

Participants completed a demographic study questionnaire, NDI, and NPRS, as well as baseline ROM measurements preintervention administered by the administering researcher. The participants were then brought to the intervention area with an envelope containing their assigned intervention. Intervention group allocations were pre-assigned and correlated with participant numbers produced by a random number generator based on goal of 30 participants. The study administering researcher and treating researcher were blinded to the assigned intervention number. The participants could receive 1 of 3 possible interventions. Participants in the exercise control (EX) group received a home exercise program (HEP) that included chin tucks, cervical ROM exercise, and bilateral shoulder shrugs with scapular retraction (Figure 2). All exercises were to be completed for 5 repetitions, 5 times a day.

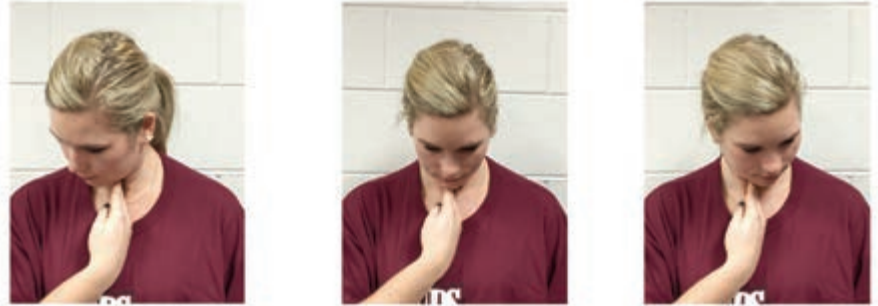
Each participant in the thoracic spine manipulation and exercise (TSM-EX) intervention group received 2 different thrust manipulation techniques directed at the thoracic spine during each treatment session: a seated middle thoracic spine thrust manipulation and a seated cervical-thoracic junction manipulation. For the middle thoracic spine thrust manipulation, the subject was seated and instructed to grasp the opposite shoulder with his hands and the treating researcher placed his or her upper chest at the level of the subject's middle thoracic spine and grasped the subject's elbow (Figure 3).<sup>7</sup> The cervical-thoracic junction manipulation was performed with the subject seated and clasping his or her hands across the base of the neck, and the treating researcher weaved his arms through the patient's arms until his hands rested slightly below the patient's hands (Figure 4).<sup>14</sup> Following the manipulation techniques, all subjects were instructed in the same exercises as the control group to

*Complete the following 5x per day during your participation in the study.*

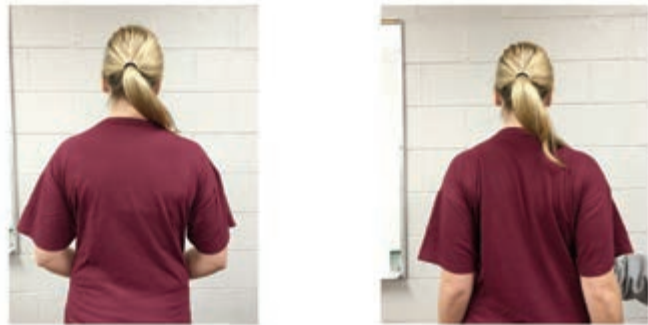
1. Chin Tucks: 5 repetitions, 5 times a day; hold chin tuck for 5 seconds



2. Cervical range of motion (4-finger exercise): 5 repetitions, 5 times a day



3. Bilateral shoulder shrugs and scapular retractions: 5 repetitions, 5 times a day



**Figure 2. Home exercise program.**

be completed at home throughout the week.

The KT and exercise (KT-EX) intervention group participants received cervical spine KT and were also given the same exercises as the control group to be completed after the application of KT and at home throughout the week. For the KT application, each participant was seated on a treatment table with feet flat on the ground with an upright erect seated posture. All hair was placed in a manner for the cervical spine to be completely exposed. The following protocol for preparation and application of KT was modeled after the protocol used by Saavedra-Hernandez et al,<sup>10</sup> which showed positive results

in the randomized control trial. The treating researcher measured the KT Y-strip, 2-tailed for cervical extensors and the opening overlapping strip. The Y-strip KT was measured from T2-C4 to allow for a 70% stretch upon application to span from T2-C.<sup>27</sup> Overlapping strip of KT was measured from one-quarter inch on each side of spinous process to allow for 70% stretch upon application. The application area was cleaned with an alcohol wipe, dried, and tuf-skin tape adhesive was applied for optimal tape application. Participant's seated positioning was reassessed with feet flat on ground, upright erect seated posture, and erect head alignment. Y-strip KT was

applied in the following order: (1) slit placed at the inferior aspect of C7 spinous process and base of tape at T1-2 with 0% stretch, (2) perform chin tuck, (3) move (the participant) into right cervical side bend and right cervical rotation, (4) apply one tail of Y-strip KT on L cervical extensors with 70% stretch, (5) re-establish starting position, and (6) return to starting position and repeat on the contralateral side (Figure 5).

Same intervention protocols were conducted on days 1 and 7. At the final session on day 14 no treatment was given. The participants completed an NDI, NPRS, and GRC as well as cervical ROM measurements were taken.

## RESULTS

Eleven participants who satisfied the eligibility criteria were screened (mean  $\pm$  SD age, 24.33  $\pm$  4.8; 54.5% female), agreed to participate, and were randomized to 1 of 3 groups, TSM-EX (n=6), KT-EX (n=2), or EX alone (n=3). Baseline demographics between the groups were similar for all variables (see Table 1).

Descriptive quantitative analysis was performed to determine trends within the data. The data is shown in Figures 6-8. The KT-EX group showed a trend of decreased NPRS scores and a trend of decreased disability indicated by NDI for both weeks one and two. Additionally, KT-EX group showed a trend of improvement in GRC from baseline to week one and week one to week two. The TSM-EX group showed a trend of decreased NPRS scores and decreased disability indi-

cated by NDI for both weeks one and two. TSM-EX also showed a trend of improvement in GRC from baseline to week 1 and week 1 to week 2. The EX group showed a trend of decreased NPRS and NDI scores between baseline and week one only. The EX group also showed a trend of improvement in GRC from baseline to week 1 and week 1 to week 2. No conclusions can be made for the EX group regarding week 2 outcome measures due to injury sustained by one participant in a recreational activity. The NPRS scores over the treatment period showed overall trends of decreased pain for both intervention groups. The NDI scores over the treatment period showed overall trends of decreased disability for both intervention groups. The GRC scores showed an overall trend of improvement for both intervention groups. However, MDIC for all outcome measures were not met for either intervention group or the control group.

## DISCUSSION

The results of the current pilot study suggest the application of cervical spine KT and TSM had similar effects for reducing neck pain and disability. Both KT-EX and TSM-EX groups had similar baseline measures and showed trends of decreased pain and disability immediately after treatment, despite the chronic nature of MNP in all participants. Both KT-EX and TSM-EX groups demonstrated decreased symptoms related to MNP based on the GRC when compared to EX group. Both KT-EX and TSM-EX groups' demonstrated superior results in all

outcome measures compared to EX alone group. The results suggest KT or TSM in addition to an EX is superior to an EX alone in treating MNP. The trends demonstrated in this study, combined with the positive effects of KT in patients with whiplash,<sup>10,12</sup> suggests the application of KT to patient's presenting with MNP is a possible alternative treatment to TSM in order to decrease the patient's neck pain and disability; especially, if the patient is contraindicated for spinal manipulation or is adverse to the intervention. Nevertheless, changes in symptoms over the 2 weeks of intervention were small and of questionable clinical significance due to low number of participants. Additionally, between groups comparisons are not clinically relevant based on the nature of this small pilot study.

## Study Limitations

Due to time constraints and the narrow geographic area surveyed, the study was unable to recruit the proposed 30 participants and therefore presents data with low power due to the small number of participants. A convenience sample was used of the Tacoma, WA, area surrounding the University of Puget Sound. The small area from which we recruited may not be representative of the population of patient's with MNP. Additionally, groups were pre-randomized with the intention of 30 total participants; however, only 11 participants were recruited who met eligibility criteria, creating unequal distribution of participants in the control and intervention groups. Furthermore, the KT-EX group had the smallest number of



Figure 3. Seated middle thoracic spine manipulation.



Figure 4. Seated cervical-thoracic junction manipulation.

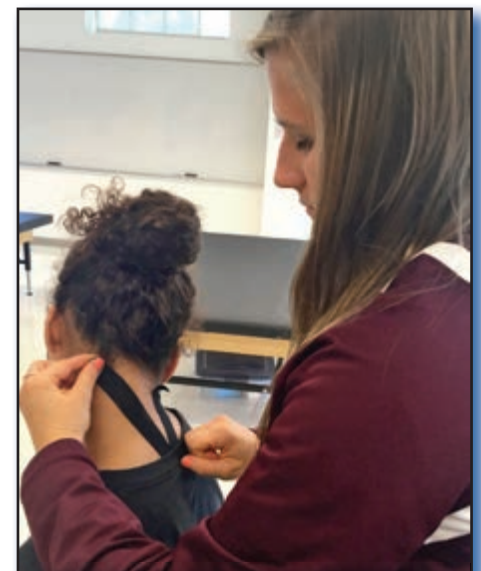


Figure 5. Application of cervical spine Kinesio Tape.

## Average NPRS Scores Over Time

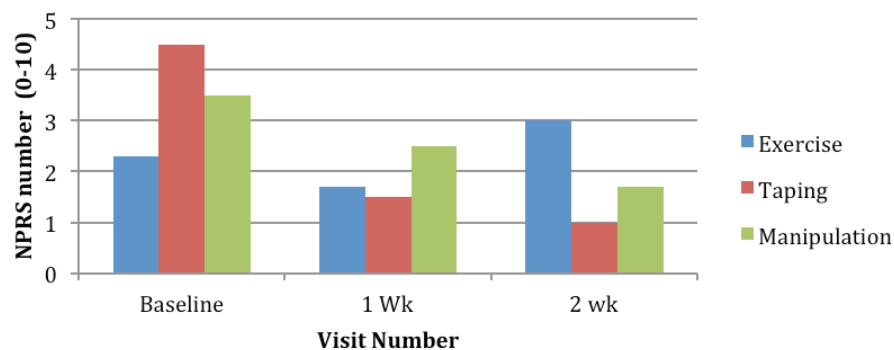


Figure 6. Numeric Pain Rating Scale scores for participants in each treatment group at each visit.

## Average NDI Scores Over Time

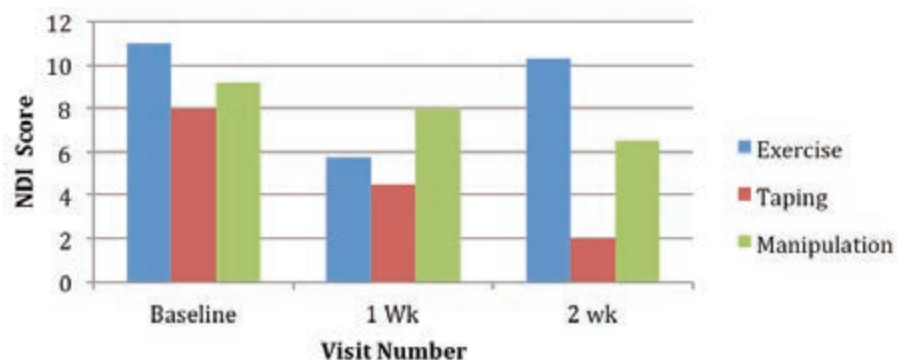


Figure 7. Neck Disability Index scores for participants in each treatment group at each visit.

## Average GRC Scores Over Time

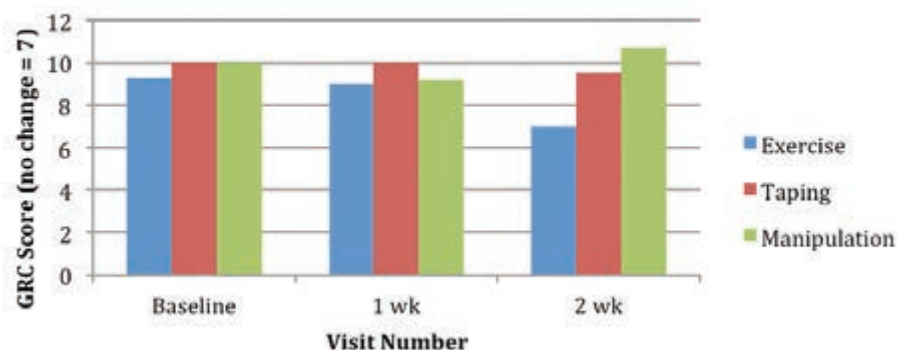


Figure 8. Global Rating of Change scores for participants in each treatment group at each visit.

participants, which warrants further caution when interpreting the results. Finally, our study looked at the immediate effects of KT and TSM on pain, disability, and symptoms; long-term effects cannot be deduced from our results but warrant future research.

## CONCLUSION

Patients with MNP receiving KT or TSM exhibited similar reductions in pain and disability over a 14-day period. Further high-quality studies with greater number of participants and replication intervention protocol used are needed to further substantiate this trend, allowing statistical analysis and greater power. This pilot study demonstrates the need to further investigate the effects of KT-EX compared to TSM-EX in patients with MNP.

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# Perceived and Tested Work Capacity in Men with Osteomyoplastic Transtibial Amputation

Carol P. Dionne, PT, DPT, PhD, OCS, Cert MDT<sup>1,2</sup>  
Adelaide South, AS<sup>1</sup>  
Derek A. Crawford, PhD<sup>3</sup>

<sup>1</sup>University of Oklahoma Health Sciences Center, Oklahoma City, OK

<sup>2</sup>Department of Rehabilitation Sciences, Mechanical Therapy Research Laboratory, Department of Rehabilitation Sciences, College of Allied Health, The University of Oklahoma Health Sciences Center, Oklahoma City, OK

<sup>3</sup>Pittsburg State University, Department of Health, Human Performance, and Recreation, Applied Physiology Laboratory, Pittsburg, KS

## ABSTRACT

**Background and Purpose:** Workers with osteomyoplastic transtibial amputation (OTA) are at risk of residuum injury due to disparity between job demand and actual performance. Targeted job demand, perceived mobility, and work performance in men with OTA were examined. **Methods:** Data from lifting, self-paced and brisk walking, Locomotive Capacity Index-5 (LCI-5) and Prosthetics Evaluation Questionnaire (PEQ) subscales, and work demand levels were retrospectively examined in similar, otherwise healthy men with OTA (employed=5, unemployed=5) and non-amputee controls (=5). **Findings:** Employed OTAs walked the greatest distances and lifted the most weight. Unemployed OTAs walked the shortest distances and scored lower in perceived mobility (LCI-5) and Ambulation, Appearance, and Utility PEQ subscales. Controls lifted less but reported greater exertion than employed OTAs. Forty percent of OTAs and 60% controls performed at targeted job demand. **Clinical Relevance:** Physical therapists should prescribe job-specific exercises for amputees to maintain work-readiness. **Conclusion:** Disparity between work readiness and targeted job demand levels may place workers with OTA at injury risk.

**Key Words:** job-related performance, residuum injury, work readiness

## INTRODUCTION

Due to improvements in health care and prosthetic technology, an increasing number of working-age adults with major amputation, such as transtibial amputation, are entering the labor force.<sup>1</sup> Therefore otherwise healthy workers with transtibial amputation who feel ready to return to work at their chosen job and actually perform at the job's level of physical demand should be at less risk for residuum injury. However, despite these improvements and assumptions, these

workers have a heightened risk injury to the residual limb (residuum) while performing job tasks, requiring time out of the prosthetic limb and out of the productive work force.<sup>2</sup>

Some contend that the actual surgical approach to amputation may influence the outcome. Proponents of osteomyoplastic residuum reconstruction, for example, claim that this surgical method produces a more anatomically stable residual limb.<sup>3</sup> Originally described by Janos Ertl in the 20th century,<sup>4</sup> the osteomyoplastic approach to transtibial amputation involves reconstruction of the distal-most tibia and fibula that are conjoined to form a bone-periosteal bridge, overlain with attachments of the distal-most anterior, lateral, and posterior lower leg muscles.<sup>4</sup> Investigators have shown that the osteomyoplastic transtibial residuum allows axial weight bearing, is consistent in limb volume over time, and workers with this type of amputation can perform similarly over a 12-month time frame to an intact comparison group.<sup>5,6</sup>

However, no studies have focused on whether those with osteomyoplastic transtibial amputation (OTA) perceive to be able to, or actually perform at, the functional capacity that their targeted job physically demands. The purpose of this study was to retrospectively examine targeted vocation, perceived physical mobility, and actual work performance in employed and unemployed men with OTA.

## METHODS

The protocol of the larger prospective study<sup>5</sup> was approved by university institutional review board prior to its conduct. Potential subjects were excluded if they had any serious endocrine (diabetes), cardiovascular, musculoskeletal, or neuromuscular condition that would preclude ability to demonstrate active, independent work performance without assistance. Women were excluded from the overall dataset due to confounding factors linked with peri- or

post-menopausal factors, like bone loss from non-weightbearing, in addition to factors linked with amputation.

For the current study, de-identified data were selected and compiled for retrospective review from 15 otherwise healthy men of working age (18-64 yrs) that were anthropometrically matched and classified into 3 groups as: controls without amputation (n=5, "C"), employed with OTA (n=5, "E"), or unemployed with OTA (n=5, "U"). Data on floor-to-knuckle lift,<sup>7</sup> two-minute self-paced and brisk walk tests,<sup>8</sup> and (from the amputee participant group) psychosocial factors from the Prosthetics Evaluation Questionnaire (PEQ),<sup>9</sup> and Locomotive Capacity Index-5 (LCI-5)<sup>10</sup> were examined and tabulated. Work-related physical demand levels were based by federal standards found in the *Dictionary of Occupational Titles*.<sup>6</sup> The PEQ has been validated for content and temporal stability in assessing functional outcome (walking, working activities) in respondents' quality of life in those of any age and with any level of lower extremity amputation.<sup>9</sup> The LCI-5 is a 10-item questionnaire that has been shown to be reliable and valid in amputees' self-report of perceived mobility.<sup>10</sup>

## RESULTS

### Measured Walking Capacity, Perceived Mobility

Employed OTA participants were able to walk a distance similar to the controls (Figure 1). However, when compared to the unemployed amputee group, the employed OTA group walked significantly greater distance in both the self-paced (mean = 508.6 ft; p = 0.0021; 95% confidence interval [CI] 37.4, 145.6) and brisk (mean = 715.3 ft; p = 0.017; 95% CI 49.4, 364.8) 2-minute walk tests (Figure 1).

Interestingly, the unemployed OTA participants also reported lower perceived mobility scores (LCI-5) than the employed group (E = 54.8/56 vs. U = 47.4/56; p =

0.0448; 95% CI 0.2 – 14.5) (Figure 2). In 3 of the PEQ subscale scores, the unemployed OTA group scored lower in ambulation (E = 92.1 vs. U = 55.6; p = 0.0425; 95% CI 1.6 – 71.3), [prosthetic] appearance (E = 94.4 vs. U = 76.4; p = 0.0329; 95% CI 1.9 – 34.0), and utility (E = 87.3 vs. U = 69.4; p = 0.0364; 95% CI 1.4 – 34.2).

### Measured Lift Capacity, Targeted Job Demand

Interestingly, matched control (C) subjects without amputation lifted less weight (mean lift-C = 49.3 lbs; U = 86.1 lbs; E = 90.6 lbs; p = 0.0308; 95% CI 3.9 – 78.8) and reported higher ration of perceived exertion (RPE/20) during performance testing (C = 14.3; U = 10.7; E = 8.8; p = 0.0369; 95% CI 0.3 – 10.6) than their counterparts with amputation (employed and unemployed) (Figure 3). Forty percent (4 out of 10) of the OTAs performed at the targeted job demand level. Sixty percent (3 out of 5) of the controls met targeted job demand level (Figure 4).

### DISCUSSION

In this small retrospective study, participants with amputation outperformed the control group in the lift test, potentially due to the level of muscle stretch and ability to lift in this small sub-group. Further, the employed OTA group covered similar distances to the controls in both of the timed self-paced and brisk walk tests. However, the employed OTA group walked greater distances in either the self-paced or brisk times walking tests than the unemployed amputation group. This deficiency in unemployed OTA group performance was further supported by reduced perceived mobility (LCI-5) and lower PEQ subscale scores. These results underscore the importance for amputees returning to work to be able to safely and confidently use the prosthetic limb and walk at variable speeds in the work environment. Limitations in brisk walking and appropriately managing the prosthetic limb may thwart safe job performance.<sup>9</sup>

Only 40% of all OTAs and 60% of controls, ie, 50% fewer of the OTAs met the demand level for their targeted employment position. Health care providers must be cognizant that risk for injury on the job is increased when workers are expected to lift beyond their own safe, functional capacity.<sup>11</sup> Biomechanical deviations noted when exceeding capacity could result in injury to the residual limb, and can place those with amputation (or any patient, for that matter) out of the productive work force.<sup>12,13</sup>

Clinicians who manage the postoperative rehabilitation of working-age adults with amputation are obligated to determine patients' functional capacity and direct therapeutic intervention to meet the physical demand level of the targeted job prior to discharge from rehabilitation. Once discharged, workers with amputation should maintain work-readiness with regular exercise regimens prescribed by their physical therapists and other fitness experts in wellness settings.

Although the current study sample size was small, these data suggest that individuals with OTA may not be physically prepared to perform at their targeted job demand level. The findings indicate urgent need for expanded study of job classification and individual work-readiness following amputation. For this study, there is insufficient information why members in the unemployed group were not working and these reasons were beyond the scope of the current study.

It was interesting to note that unemployed participants with OTA performed at the lowest capacity and perceived lower mobility than the employed OTA group. Perhaps clinicians need to determine functional capacity early in the rehabilitation process and make incremental goals toward targeted job demands to alter the patients' perception of their personal mobility and ability to return to work at the time of discharge.

The unemployed group in the current study also appeared less mobile than the employed group, showing that they are not able to functionally ambulate within their targeted work environment, regardless of ability to lift. In this study, one limitation noted in perceived mobility is the inability to walk briskly, an important work-related activity crucial to safety on the job.<sup>11</sup>

Job-specific physical therapy intervention would provide patients with OTA functional knowledge about how to safely perform work-

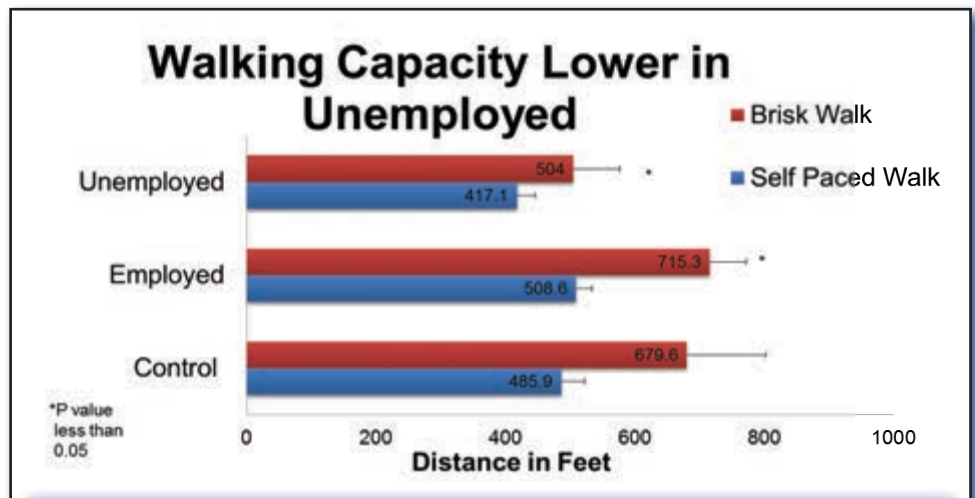


Figure 1. Distance walked during brisk and self-paced 2-Minute Walk Tests.

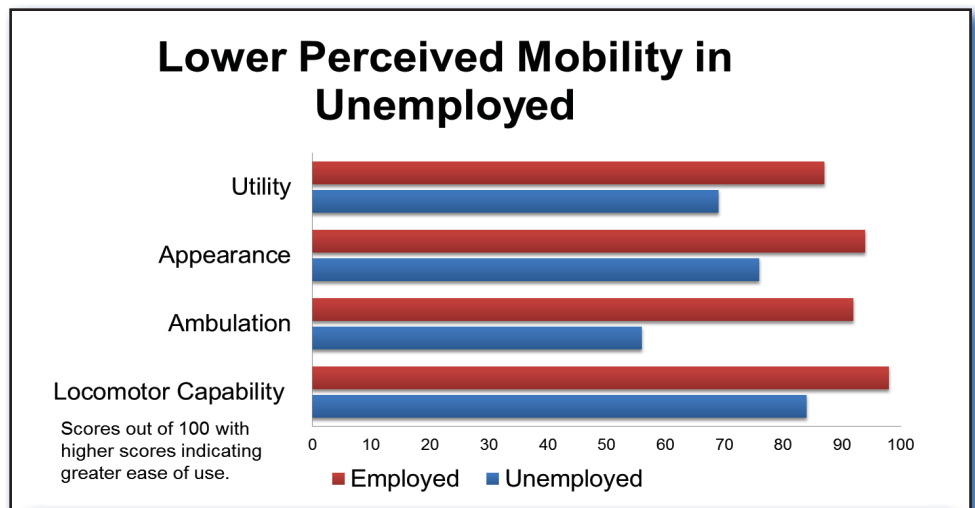


Figure 2. Perceived mobility in employed and unemployed amputee groups.

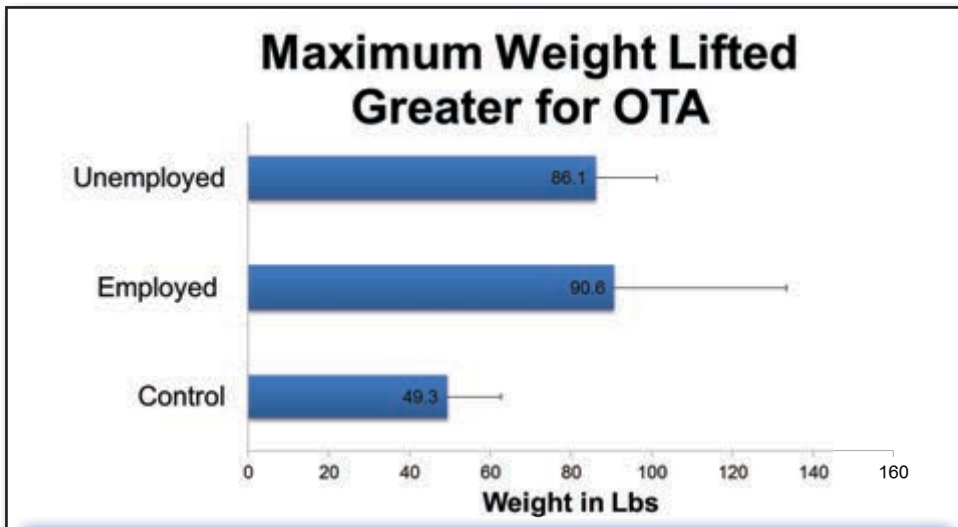


Figure 3. Lift capacity of unemployed, employed amputee groups, controls.

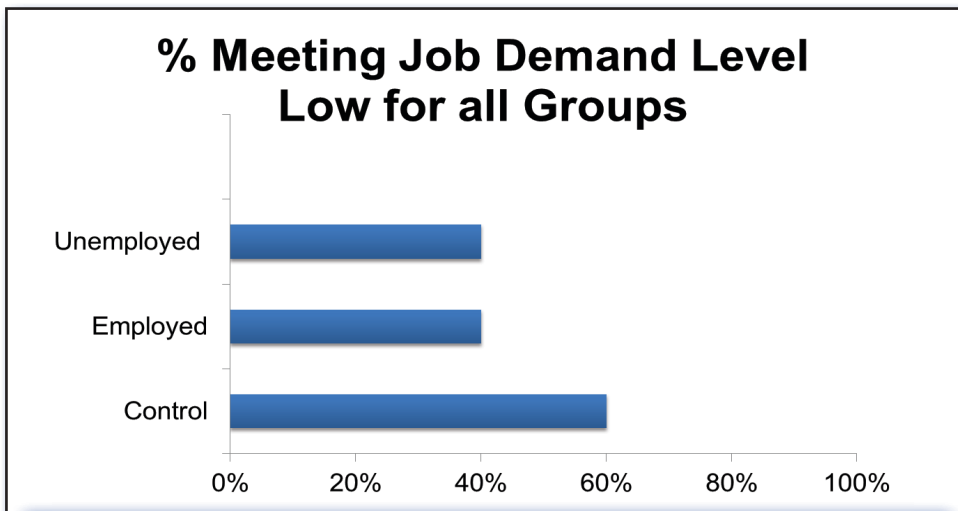


Figure 4. Percentage of participants meeting job demand level.

related tasks directly related to their work. Testing functional work capacity during and at the time of discharge from physical rehabilitation would empower individuals with OTA to know their limits at work before they place themselves at risk for injury. Further, functional capacity test results can provide valuable data to vocational rehabilitation professionals. This will effectively guide training of those with amputation re-entering the work force but who are unable to return to their former employment. The end result will be better preparation in gainful employment at a physical demand level at which they are safely capable.<sup>11,13</sup>

## CONCLUSION

Disparity between perceived and physical capability of men with OTA and job demand level may place them at risk for work-related

injury. Small sample size provides implications, requiring expanded study, to substantiate generalized need for additional job-specific rehabilitation and/or vocational education before return to work.

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# 2017 CSM Award Winners

San Antonio, Texas

Photos courtesy of Dan White, Kenta Photography ([www.kentaphoto.com](http://www.kentaphoto.com))

## PARIS DISTINGUISHED SERVICE AWARD

The Paris Distinguished Service Award is the highest honor awarded by the Orthopaedic Section and is given to acknowledge and honor an Orthopaedic Section member whose contributions to the Section are of exceptional and enduring value. The recipient of this award is provided an opportunity to share his or her achievements and ideas with the membership through a lecture presented at APTA Combined Sections Meeting.



**Steven R. Clark, PT, MHS, OCS**, has been an active member of the APTA for 39 years and the Orthopaedic Section for 33 years, and he has served the association at the chapter, section, and national levels. At the chapter level, he served as the Iowa Chapter President, Vice President, Chairman of the Education Committee, Chief Delegate, Delegate to the APTA HOD, and Treasurer.

Steve also served on the Iowa State Board of Physical Therapy and Occupational Therapy Examiners demonstrating his commitment to protecting consumers from a regulatory perspective. Nationally, Steve served on both the APTA and Orthopaedic Section's Finance Committee from 2002 to 2008. In 2008 Steve was elected as Treasurer of the Orthopaedic Section and served in this position until 2015. He also served on the Section's continuing education and dues increase task forces. In 2008 during the national economic decline, Steve made some prudent financial decisions that allowed the Section to emerge in a very strong financial position. The Board of Directors established the Research, Education, and Advocacy Fund as recommended by the Finance Committee. Under Steve's leadership, this fund saw substantial growth from \$716,183 in 2008 to \$2.3 million in 2013. He also had the foresight in 2013 to establish the building fund from the sale of property owned by the Section to support modifica-

tions and updates to the Section's building. Steve has been unwavering in his leadership initiatives and service to the Section and profession. His record of service and engagement at the chapter and section levels is second to none. He has served the Section in one of the most challenging positions, that being the Treasurer and financial steward of the organization during very difficult economic times.

It is an honor and privilege to present Steven R. Clark the 2017 Paris Distinguished Service Award.

## ROSE EXCELLENCE IN RESEARCH AWARD

The purpose of this award is to recognize and reward a physical therapist who has made a significant contribution to the literature dealing with the science, theory, or practice of orthopaedic physical therapy. The submitted article must be a report of research but may deal with basic science, applied science, or clinical research.



**Julie Fritz, PT, PhD, FAPTA**, is a Distinguished Professor in the Department of Physical Therapy and Athletic Training, and Associate Dean for Research in the College of Health at the University of Utah. She received her Master of Science in Physical Therapy from the University of Indianapolis and her PhD in Rehabilitation Science at the University of Pittsburgh. Her research interests have focused on examining treatments for individuals with low back pain, matching the most effective treatments to various sub-groups of patients, and examining the outcomes of translation of decision-making strategies into physical therapy practice. Her research has been funded by the National Institutes of Health, the Agency for Healthcare Research and Quality, Department of Defense, PCORI and the Physical Therapy Foundation. Dr. Fritz is currently an Editor of the *Journal of Orthopaedic and Sports Physical Therapy*, and

an Editorial Board Member of the *European Spine Journal* as well as a member of the Cochrane Back Review Group. Publications she has authored or co-authored have been recognized by the Orthopaedic Section with the Rose Excellence in Research Award on 5 previous occasions. Dr. Fritz has received the Marian Williams Award for Research in Physical Therapy, the Dorothy Briggs Memorial Scientific Inquiry Award, the Helen Hislop Award for Outstanding Contributions to the Professional Literature, the Jules M Rothstein Golden Pen Award for Scientific Writing as well as designation as a Catherine Worthingham Fellow.

## JAMES A. GOULD EXCELLENCE IN TEACHING ORTHOPAEDIC PHYSICAL THERAPY AWARD

This award is given to recognize and support excellence in instructing orthopaedic physical therapy principles and techniques through the acknowledgement of an individual with exemplary teaching skills. The instructor nominated for this award must devote the majority of his or her professional career to student education, serving as a mentor and role model with evidence of strong student rapport. The instructor's techniques must be intellectually challenging and promote necessary knowledge and skills.



**Joel E. Bialosky, PT, PhD, OCS, FAAOMPT**, is a Clinical Assistant Professor in the Department of Physical Therapy at the University of Florida.

Joel worked for many years clinically before pursuing his graduate degree and is

adept at moving between the orthopaedic clinical environment and the classroom, using his extensive clinical background to provide context and meaning for students. Joel has been a driving force behind 'blending' the MSK courses at UF. He saw the potential for progressive and innovative changes in his courses and was an early adopter of moving the didactic content online and focusing classroom contact on structured class time, emphasizing hands on examination and intervention techniques along with clinical problem solving. In addition, his course extensively uses the online platforms, such as discussion boards, allowing interaction between faculty and students; for example, specific topics related to student observations during clinic visits in early course work.

Joel's well-established and well-respected research agenda focuses on outcomes of manual therapy interventions, and the mechanisms underpinning these outcomes. He has a mean relative citation ratio of 2.4, indicating that his work is 240% more influential than other funded researchers in his area of expertise. His work has also been recognized by publication awards from the Journal of Orthopaedic and Sports Physical Therapy in 2009 and 2013, and the John Medeiros Most Influential Paper Award in the Journal of Manual and Manipulative Therapy in 2011. He has given invited key note presentations on manual therapy at the American Academy of Orthopaedic and Manual Physical Therapists annual conference in 2010 and Mississippi Physical Therapy Association Annual Conference in 2013, as well as the International Massage Therapy Research Conference (2011) and International Federation of Orthopaedic and Manual Physical Therapists Conference in 2016. Joel brings this passion to the classroom, where he melds his clinical expertise and training with his research expertise. Early recognition of his potential contribution to the profession was recognized with the American Physical Therapy Association's Margaret L. Moore Award for Outstanding New Academic Faculty Member in 2013.

Joel influences student education beyond the classroom. He began a student-run clinic providing pro bono care for residents of Gainesville in 2009. Joel has volunteered to supervise the clinic at least once a month since it started. He has been a tireless volunteer and is actively involved in management decisions affecting the clinic. He has also incorporated participation in the pro bono clinic into his classes. Joel initiated 'patient days' where patients are recruited from the pro bono clinic and attend the MSK class.

Joel has led entry level physical therapy students on teaching outreach missions to Nicaragua presenting week long courses related to Orthopaedic Physical Therapy Practice. The Nicaraguan physical therapists were grateful for these presentations and the accompanying students came away with an appreciation for Joel's teaching ability.

In summary, Joel Bialosky exemplifies excellence in teaching Orthopaedic Physical Therapy. He distinguishes himself through his passion, enthusiasm, knowledge, and commitment to teaching.

### **RICHARD W. BOWLING – RICHARD E. ERHARD ORTHOPAEDIC CLINICAL PRACTICE AWARD**

This award is given to acknowledge an individual who has made an outstanding and lasting contribution to the clinical practice of orthopaedic physical therapy as exemplified by the professional careers of Richard W. Bowling and Richard E. Erhard. Individuals selected for this award must have been engaged in extensive orthopaedic physical therapy clinical practice for at least 15 years and have positively and substantially affected the shape, scope, and quality of orthopaedic physical therapy practice.



**Joseph J. Godges, DPT**, has not only been involved in clinical practice and professional service for many years, but the quantity and quality of his outcomes are outstanding. It is valuable to note that Joe has been a clinician, mentor, researcher, and educator, and an active member of the APTA and the Orthopaedic Section for 36 years and, during this time, has distinguished himself as a visionary clinician, educator, and researcher.

Joe has served the profession in a variety of appointed and elected positions. It is clear that a majority of his service has been in the realm of orthopaedic clinical practice and specialization. He has served on the American Board of Physical Therapy Specialties (ABPTS) and was instrumental in the development of the model SACE for ABPTS and coordinated and managed the OCS annual

examination standards meetings. He also served as a member of the Committee on Clinical Residency and Fellowship Program Credentialing from 1998 – 2001, which developed the requirements and standards for clinical residency and fellowship programs. Joe's commitment to dissemination of his scholarly work to further substantiate orthopaedic physical therapy practice, education, and research has been far reaching. He has published over 22 peer-reviewed scientific journal articles, three edited book chapters, editorials, and other publications. Joe has devoted decades of service at the national, section, and chapter level with regards to clinical practice guideline development.

Joe Godges has been influential, collaborative, and instrumental in the development of clinical residency and fellowship programs throughout the United States and abroad. Joe has served the Orthopaedic Section in many capacities. He served as a member of the Section's Finance Committee from 1997-2002. Joe was elected as Treasurer in 2002 and served in this capacity until 2008. Joe also served as the Orthopaedic Section member to the JOSPT from 2002-2008. Further, he represented the section in 2006 as a member of the APTA search committee for a CEO. Currently, Joe serves as the editor of the CPG initiative for the section as previously mentioned with a goal of producing 21 CPG's by 2021. This has been a daunting initiative which Joe has led from the inception. It is an honor and privilege to present the 2017 Richard W. Bowling – Richard E. Erhard Orthopaedic Clinical Practice Award to Joseph J. Godges.

### **OUTGOING OPTP BOOK REVIEW EDITOR**



**Michael Wooden, PT, MS, OCS**, has served the Orthopaedic Section as OPTP Book Review Editor from 1997-2016.

## OUTSTANDING PTA STUDENT AWARD

The purpose of this award is to identify a student physical therapist assistant with exceptional scholastic ability and potential for contribution to orthopaedic physical therapy. The eligible student shall excel in academic performance in both the pre-requisite and didactic phases of his or her educational program, and be involved in professional organizations and activities that provide the potential growth and contributions to the profession and orthopaedic physical therapy.



**Lindsay Bowen, SPTA**, of Lexington, Kentucky is currently a second-year PTA student at Somerset Community College (SCC). Lindsay holds a Bachelor of Science Degree in Kinesiology from the University of Kentucky. She serves as Philanthropy Chair of her class and is a peer mentor and tutor. She is an active member of the Kentucky Physical Therapy Association (KPTA) where she serves as Director of the KPTA's Student Special Interest Group. In 2016, she was named to the KPTA All-Academic Team. At SCC, she is a member of Phi Theta Kappa International Honorary and the Physical Therapy Student Organization. She is also the recipient of the KCTCS Presidential Scholarship.

Lindsay has been active in a number of charitable and community service activities including raising awareness of homeless issues through conducting food and clothing drives for a local homeless shelter, fundraising for causes including the Special Olympics and ALS research, and participating in activities to support research through the Foundation for Physical Therapy.

Lindsay is the daughter of Junior and Velma Bowen of Dry Ridge and is expected to graduate with an Associates of Applied Science Degree from the Physical Therapist Assistant Program in May 2017.

## OUTSTANDING PT STUDENT AWARD

The purpose of this award is to identify a student physical therapist with exceptional scholastic ability and potential for contribution to orthopaedic physical therapy. The eligible student shall excel in academic performance in both the professional and pre-requisite phases of his or her educational program, as well as be involved in professional organizations and activities that provide for potential growth and contributions to the profession and orthopaedic physical therapy.



**Kaley Robertson, SPT**, is currently a 3rd year student in the Doctor of Physical Therapy program at the University of Kentucky and has distinguished herself throughout her academic career in academic performance, research, and service. She graduated with Summa Cum Laude from the University of Kentucky (UK) in 2014 with a bachelor's degree in Kinesiology and is expected to graduate with the doctor of physical therapy degree in August 2017. She has performed with excellence in her academic work while working as a lab manager in the University of Kentucky's BioMotion Research Lab under the watchful eye of Dr. Brian Noehren.

The biomechanics research she has completed in the lab is being presented as a platform presentation at the 2017 CSM in San Antonio. Additionally, Kaley serves the underinsured citizens of Lexington, Kentucky in the UK Student Run Free clinic, Samaritan's Touch, as well as serving her class as a fund raising chair and her church as a Sunday school teacher. Kaley has great positive energy and a bright future ahead of her in the physical therapy profession.



### RESEARCH SURVEYS

As a service to Orthopaedic Section members and the research community, the Orthopaedic Section, APTA, has agreed to email occasional invitations to participate in research surveys to Orthopaedic Section members. Although these research surveys have met the preliminary screening requirements of Section policy, **the Orthopaedic Section is not involved in these research projects and does not endorse these research projects.** The Orthopaedic Section is acting solely as an agent for dissemination of these occasional research surveys.

If you would like to opt-out of receiving research-related survey emails, please send an email to: [tfred@orthopt.org](mailto:tfred@orthopt.org), including "Opt-out surveys" in the subject line.

**Did you know you have the option of opting out of the print version of *Orthopaedic Physical Therapy Practice (OPTP)*?**

**If you would prefer an electronic version only, please contact Carol Denison at the Section office, [cdenison@orthopt.org](mailto:cdenison@orthopt.org).**

**In the subject line, just indicate Opt Out OPTP.**



# Wooden Book Reviews

Rita Shapiro, PT, MA, DPT

Book Review Editor

Book reviews are coordinated in collaboration with Doody Enterprises, Inc.

**Physical Therapy in Intervertebral Disk Disease: A Practical Guide to Diagnosis and Treatment**, Thieme Medical Publishers, Inc., 2016, \$69.99

ISBN: 9783131997616, 218 pages, Hard Cover

Author: Broetz, Doris, PT; Weller, Michael, MD

**Description:** This is a guide for the diagnosis and treatment of lumbar, thoracic, and cervical disk disease, supported by selected research articles. It represents a progression of the McKenzie method to a therapeutic program called BASE PT (Behavioral, Active, Self-determined, Evidence-based Physical Therapy). **Purpose:** The purpose is to focus treatment on diagnosis and offer progressions for patients with disk disorders based on changing symptoms and reaching defined targets. The authors succeed in providing an approach to manage a pervasive medical concern by incorporating evidence and promoting change in accordance with technology advances. **Audience:** This book is written for clinicians who treat patients with back pain and who seek to effectively treat those with disk disorder and return the patients to functional levels and improved fitness. A physical therapist and a physician collaborated on this book, which is based on their clinical studies and treatments. **Features:** The book cites, compares, and critiques research with consideration for clinical application. Research articles are integrated throughout the book and add to the information presented in the anatomy chapter. Specific chapters cover lumbar, thoracic, and cervical disk damage and treatment. Other topics include rehabilitation and prevention, psychosocial risk factors, and associated diseases. Large stylized exclamation points emphasize "Notes" that include clinical pearls and comments. "Instructions for the Patient" summarize key points with effective wording. The book provides information on medical and physical therapy diagnosis as well as general differential diagnosis in the medical and neuromuscular systems. Illustrations and radiographs provide additional useful information. **Assessment:** This is a concise, high-quality guide for dealing effectively with patients who have disk disease. The book is useful because evidence is combined with treatment and patient concerns to promote well-being. I recommend this book for clinicians who treat patients with intervertebral disk disorders.

*Karin J. Edwards, MSPT  
Providence Health & Services*

**Mechanisms and Management of Pain for the Physical Therapist, 2nd Edition**, Wolters Kluwer Health, 2016, \$94.99

ISBN: 9781496343239, 448 pages, Soft Cover

Editor: Sluka, Kathleen A., PT, PhD, FAPTA

**Description:** Written by an interdisciplinary group of researchers and clinicians, this book is a comprehensive education in the manage-

ment of pain for physical therapists, based on several association initiatives of the International Association for the Study of Pain (IASP). This update of the original 2009 edition has more authors and includes five more chapters. **Purpose:** The purpose is to fill a gap in the education of physical therapists, a goal the book meets with excellent content in each chapter. The editor, Kathleen Sluka, is the Kate Daum Research Professor in the Department of Physical Therapy and Rehabilitation Science Pain Research Program at the University of Iowa. She is an awarded researcher as well as a physical therapist and fellow of the American Physical Therapy Association (APTA). She also is active in the IASP and its local chapter, the American Pain Society. **Audience:** Although intended for students, the book also is a primer for practicing physical therapists actively involved in the treatment of pain. More broadly, the audience includes physical therapy students, educators, and other practitioners who desire a complete understanding of the underlying pain mechanisms and management. **Features:** The book is divided into four major sections with a total of 24 chapters authored by variety of experts in the field of pain. The editor contributes to over half of the chapters either as a lead author or coauthor. The first section introduces basic concepts and mechanisms of pain. The five chapters discuss pain models, central and peripheral pathways, motor control and pain, and pain variability. The second section is dedicated entirely to physical therapy pain management. Eight chapters allow for complete and concise coverage of pain assessment, education and self-management of pain, and the use of electrophysical modalities and manual therapy. The three chapters in the third section address using an interdisciplinary approach to pain management, including medical and psychological management. The last section covers a variety of topics under the heading of pain syndromes. Regional coverage of neck pain and low back pain is presented as well as osteoarthritis and rheumatoid arthritis. A separate chapter covers temporomandibular disorders and headache. Myofascial and fibromyalgia are discussed along with central neuropathic pain and complex regional pain syndrome. Case studies integrate the content with practical clinical scenarios to enhance decision making. Chapters are concisely written, contain many color illustrations, figures, tables, and references that support the strong evidence-based theme of the book. Despite having many authors, the book flows well and the topics are covered in enough detail to inform but not overwhelm. The only shortcoming is actually its strength, in that it cannot possibly cover all topics in detail. However, it is hard to put down and will motivate readers to seek out the abundant references. This alone makes the book an essential reference for physical therapists. **Assessment:** This book stands alone in the field of pain management. It serves well not only students, but also clinicians who want to become more knowledgeable about pain management to improve patient care. The second edition is a nice upgrade. The book has filled a void in the area of pain management and readers ultimately benefit. I highly recommend the book.

*Christopher J. Hughes, PT, PhD, OCS, CSCS  
Slippery Rock University*

**Physical Therapy Case Files: Sports**, McGraw-Hill Education, 2016, \$40

ISBN: 9780071821537, 475 pages, Soft Cover

Editor: Brumitt, Jason, PT, PhD, ATC, CSCS

**Description:** The Physical Therapy Case Files series is meant to provide a bridge between the didactic knowledge learned in the classroom and patient-based clinical cases, backed by evidence-based research. The first volume in this series addressed orthopedics. This one focuses on the athletic population and sports-related injury. **Purpose:** The purpose is two-fold. First, the book is meant to present PT educators with case-based scenarios to widen the breadth and depth of resources for their students. Second, it aims to bridge didactic learning with evidence-based practice applied to realistic case scenarios for students. These are very worthy objectives. When instructors present real case scenarios from scratch, based on their own clinical practice, a biased patient portfolio can result. Also, generating original cases can be extremely time-consuming. The authors and contributors do an excellent job of presenting a wide variety of sports-related injuries in an accessible format for both teachers and students. **Audience:** The book is useful for its intended audience of both educators and students. It is also extremely useful for those physical therapists enrolled in orthopedic or sports physical therapy residencies. The author is a PT, ATC, and a PhD, who has partnered with many other credible authorities for the cases. **Features:** The book presents 26 sports-related PT cases, ranging from overuse shoulder pain to concussion, and each case is divided into seven sections. The first presents the case and provides key definitions, patient objectives, and PT considerations, while the second provides abbreviated information to help readers further understand the health condition. The third section covers the role of the PT in the management of the patient, along with the role(s) of other healthcare professionals. The fourth contains important information regarding examination, evaluation, and diagnosis. This may include information obtained from chart review, physical exam, and outcome tools, when appropriate. Section five presents the most appropriate PT interventions along with any current evidence to support each treatment, while the sixth section uses the Strength of Recommendation Taxonomy (SORT) to present at least three diagnostic tools and/or interventions and quantify the quality and strength of each based on available research. The final section reinforces learned concepts by offering a few related multiple-choice questions. **Assessment:** As a PT educator in both entry-level and residency curricula, I found this book, as well as the one on orthopedics, excellent contributions to the library of students, teachers, and practicing physical therapists. The compilation of cases provides readers with better exposure to a variety of cases that may otherwise be unfamiliar or inaccessible.

*Amanda M. Blackmon, PT, DPT, OCS, CMTPT  
Mercer University College of Pharmacy and Health Sciences*

**Geriatric Physical Therapy: A Case Study Approach**, McGraw-Hill Education, 2016, \$65

ISBN: 9780071825429, 141 pages, Soft Cover

Editor: Staples, William H., PT, DHS, DPT, GCS, CEEAA

**Description:** This book covers medical diagnoses that physical therapists will frequently encounter while treating geriatric patients. The book does not employ supplemental online content or offer additional online references and features to augment its self-study approach. **Purpose:** The book is intended to serve several purposes. First, as a supplemental book for use in the doctor of physical therapy curriculum. The book's case study design directs students to research different aspects of primary medical diagnoses, and the effects the diagnoses have on the patient's return to function. Second, as a self-study guide for the physical therapy licensure or geriatric specialty exam, or as a study guide for therapists returning to the geriatrics field. Finally, as an instructive guide to performing a comprehensive geriatric exam by facilitating an assessment of functional ability, and developing a comprehensive treatment plan. **Audience:** The target audiences include professors who can use the book as a supplemental text for general pathology or gerontology courses, new graduates studying for the licensure exam who can use it as a self-directed study guide, and experienced therapists studying for the geriatric specialty exam or returning to the field of geriatrics. **Features:** The book covers a variety of treatment categories, including musculoskeletal, neuromuscular, cardiovascular/pulmonary, integumentary, and other geriatric issues. A useful introduction begins each chapter highlighting and discussing how a patient's geriatric status influences the physical therapy plan of care and treatment progression. One deficiency that lessens the book's use as a study guide is the failure to provide answers to the case study questions. Moreover, the absence of online references to promote directed learning does not ensure that readers form the correct hypothesis and answer. It falls short as a self-study guide for the physical therapy licensure or geriatric specialty exam, or as a study guide for therapists returning to the geriatrics field. **Assessment:** This book uses a case study approach to facilitate an understanding of geriatrics. If the book provided answers to the case study questions, its use as a study guide would be enhanced. It provides no answers either through online references to direct readers to proper conclusions or an answer appendix. It does not go into functional exam details nor does it provide information about the proper uses, predictive values, and reliability of geriatric functional measure tests. As a result, it is most suitable as a good supplemental case study book for physical therapy professors to help facilitate group discussion and self-directed learning.

*Jennifer Hoffman, PT, DPT, OCS  
Select Rehabilitation*

The goal of the Finance Committee is to provide funding to optimally accomplish the practice, research, and education goals of the Orthopaedic Section. To that end I have summarized below our financial state and how we are supporting these efforts for our members.

In 2016, our total Revenue exceeded prior year by 7%. This increase was driven by an increase in revenue received from CSM and sales of the Section's Independent Study Courses (ISC) (Figures 1 and 2). In addition, our expenses were reduced by 3% compared to prior year. Our education related expenses have increased over the past few years, but this is mainly due to adding the Annual Orthopaedic Section Meeting to our list of educational offerings (Figure 3).

The Net Assets (which includes investments) dropped by 2.4% in 2015. This is mainly due to a line of credit taken out by the Section for a new HVAC system for the office building (Figure 4).

The Orthopaedic Section, per policy, must keep between 40% and 60% of our annual expenses in a reserve fund. The recommendation is that the Section keep at least 60% in reserve; for 2017 this amount is \$1,241,916. Currently, the Section has \$1,734,206, or 87%. The Board is discussing how to use some of this money to benefit our members.

In summary, the Section remains very healthy financially. Dues have not been increased since 1994, our funds are being used to support our strategic plan, and our focus has been on making good financial decisions to enable the Section to effectively and efficiently provide the services expected by our membership.

If you have any specific questions please contact the Section office and we will respond as soon as possible.

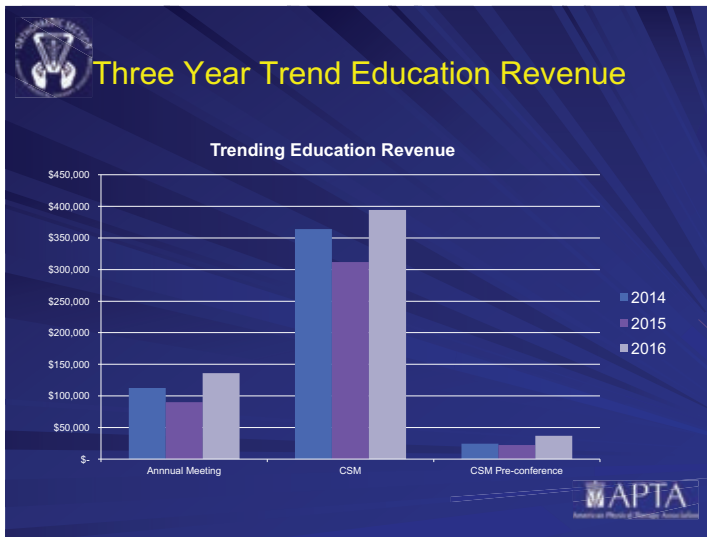


Figure 1.

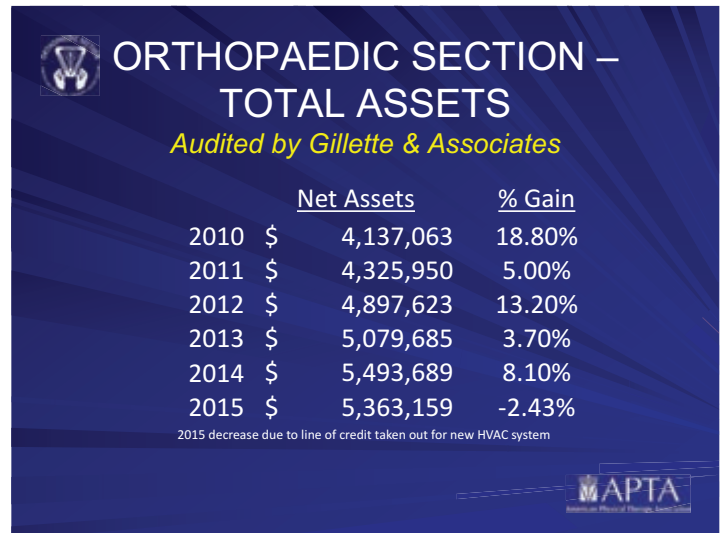


Figure 3.

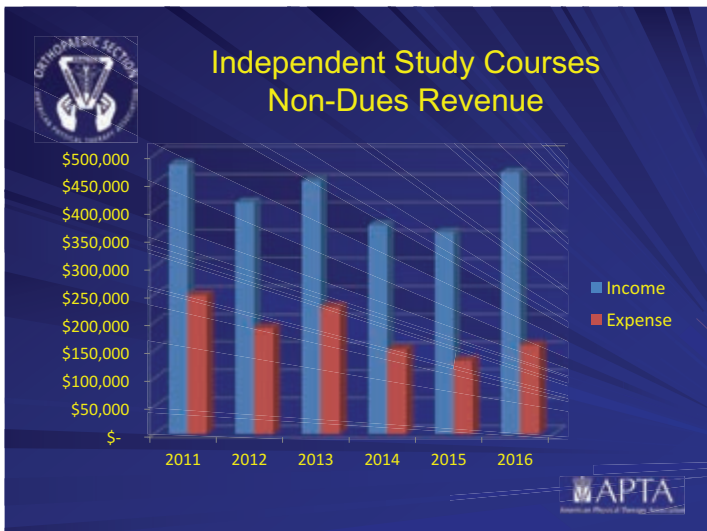


Figure 2.

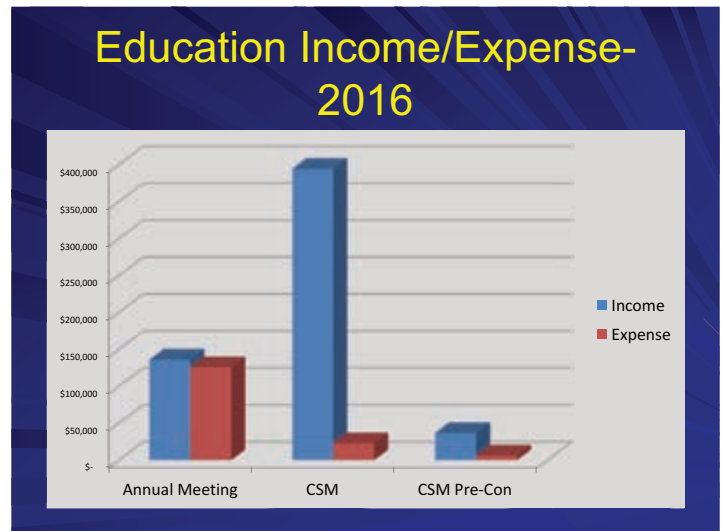


Figure 4.

# Bylaw Amendments

The Orthopaedic Section, APTA, Inc, Board of Directors is presenting the following bylaw amendment motions adopted by the Board at their July 2016 Board of Directors meeting. The membership will be notified of the proposed bylaw amendments in the April 2017 issue of *OPTP*. They will be voted on by electronic ballot sent on May 1, 2017 with a deadline to receive all votes on May 31, 2017:

## Amendments adopted by BOD

July 2016

## Membership notified

OPTP April 2017

## Electronic ballot sent on

May 1, 2017

## Deadline to vote

May 31, 2017

### BYLAW AMENDMENT #1

**Action Item:** Proposed Bylaw Amendment #1

=**MOTION 1**= Scott Davis, Director, moves that the Orthopaedic Section Board of Directors approve the following bylaw amendment –

#### Section Amendment

#1 MOVE TO AMEND ARTICLE IV. MEMBERSHIP, SECTION 1: CATEGORIES AND QUALIFICATIONS OF MEMBERS by adding, “PT – Post Professional Student” after “Life Physical Therapist”.

**Support Statement:** Post-professional student dues appear in Article XII Finance, Section 3: Dues. The following proposed amendment would add Post-professional student to the membership categories section of the bylaws.

**Fiscal Implication:** None

### BYLAW AMENDMENT #2

**Action Item:** Proposed Bylaw Amendment #2

=**MOTION 2**= Scott Davis, Director, moves that the Orthopaedic Section Board of Directors approve the following bylaw amendment –

#### Section Amendment

#2 MOVE TO AMEND ARTICLE VIII. COMMITTEES, SECTION 2: NOMINATING COMMITTEE, C. TERM, by deleting and replacing “senior member of the Committee” with, “member having served the greatest number of years on the committee”.

**Support Statement:** To more accurately reflect what is meant by “senior member” the phrase “member having served the greatest number of years on the committee” is being proposed.

**Fiscal Implication:** None

### BYLAW AMENDMENT #3

**Action Item:** Proposed Bylaw Amendment #3

=**MOTION 3**= Scott Davis, Director, moves that the Orthopaedic Section Board of Directors approve the following bylaw amendment –

#### Section Amendment

#4 MOVE TO AMEND ARTICLE IX. OFFICIAL PUBLICATIONS, SECTION 2: PUBLICATION NOTICE as follows: “Pub-

lication in *Orthopaedic Physical Therapy Practice*, or *The Journal of Orthopaedic and Sports Physical Therapy*, Orthopaedic Section website (orthopt.org), or Osteo-blast, of meeting notices, issues to vote upon, or a slate of nominees shall constitute official notice to all members, provided *Orthopaedic Physical Therapy Practice* or *The Journal* notice has been mailed, posted or blasted to the membership thirty (30) days prior to the meeting date or the deadline for receipt of a mailed ballot.”

**Support Statement:** This change is being proposed to incorporate all current methods of sending official notice to members.

**Fiscal Implication:** None



**We have a new Special Interest Group—the Orthopaedic Residency/ Fellowship SIG. Please see Matt Haberl’s official announcement on page 121.**



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# OCCUPATIONAL HEALTH

## SPECIAL INTEREST GROUP

### President's Update

Lorena P. Payne, PT, MPA OCS

#### Recognition of Outgoing Leadership

We recognized the outgoing members of the OHSIG leadership for their contributions to the profession and especially to the goals of the SIG. We acknowledge the hours of work and dedication to outgoing Vice President/Education Chair, **Doug Flint**, Nominating Committee Chair, **Bob Patterson** and Membership/Communication Chair **Chris Studebaker**. They are each recognized for contributions to the strategic goals and work on behalf of this specialty practice.

#### Introducing New Leadership

Welcome incoming Vice President/Education Chair, Brian Murphy and Nominating Committee Member, Trisha Perry. We look forward to communicating with these new members of the SIG leadership team. Contact information can be found on the OHSIG webpage at orthopt.org.

#### Work Rehabilitation Clinical Practice Guideline

The clinical practice guideline (CPG) will be available for review on the Orthopaedic Section website. Comments and questions are welcomed and will be considered prior to submitting for publication. Those in attendance at the OHSIG membership meeting in San Antonio were the first to see the specific guideline statements. The CPG was been funded by a grant through APTA and by the Orthopaedic Section's Occupational Health Special Interest Group.

#### Defining Occupational Physical Therapy Practice

Based on the review of literature for the Work Rehabilitation CPG, it is very apparent that inconsistent language and definitions exist for procedures and interventions unique to practice in this area. The documents that serve to bring consistency of language and form a basis for understanding practice parameters are being developed. Work groups have been formed to revise all of the current documents and these updates can be found on the OHSIG webpage at orthopt.org. The items include the following topics: Evaluating Functional Capacity, Management of the Acutely Injured Worker, Prevention and Ergonomics, Legal and Risk Management, The Physical Therapist in Occupational Health, and Advanced Work Rehabilitation.

#### Direct to Employer-Building Supply and Demand

Check out the free webinar offered through the APTA Learning Center. A common theme over the past year at House of Delegates and at the Combined Sections Meeting in San Antonio has been that of POPULATION HEALTH. This is not a new idea for those of us working closely with employers. Since many of us are on the job site every day in consulting roles as well as injury management, we are immersed in the day to day impact of the health of individuals as they perform the essential functions of their jobs. Physical therapists working on job

sites know that this relationship with employers is an opportunity to impact the costs associated with high risk populations. Physical therapists can raise awareness and change a culture that ignores the general health of the work force and concentrates only on work related illness and injury. Dee Edington said it best through years of work at University of Michigan, "Companies throughout the world are beginning to invest in creating work cultures where promoting wellness and treating sickness are equal partners. No company will be successful in a globally competitive world with anything but healthy and productive people." (Zero Trends)

### Research Article Review: Use of Vital Signs Prior to Pre-employment and Functional Testing

Deirdre "Dee" Daley

*Synopsis written in collaboration and with permission from the Cardiopulmonary Section, APTA.*

Physical therapists working in occupational health often evaluate vital signs as part of pre-employment or functional testing—considering the findings within the context of safety for starting or continuing a functional test. While a number of guidelines have played an increasingly prevalent role in health risk evaluation and management, there have been limited discussions about the impact and use of specific cut points related applicant or employee testing. Individuals setting safety policies should consider the implications of guidelines from both a generalized/early "health risk" and "adverse impact" perspective. A recent study published in the *Cardiopulmonary Physical Therapy Journal* (the journal of the Cardiovascular and Pulmonary Section) discuss some of these topics as well as the implications of various cut points on a large sample of working age job applicants from across the country.<sup>1</sup>

The study was designed to identify the eligibility of job applicants for safe functional testing, evaluating the impact of various pre-test blood pressure (BP), and heart rate (HR) cut points. Screening criteria were applied to job applicant data as a potential determination of an adverse event during functional testing. Applicant data collected from 269,527 subjects between 2005 and 2012 at 990 clinics for 37 employers across all US states and the District of Columbia was analyzed to test the impact of various BP and HR screening cut point standards. Job demands used as the basis of the functional screens ranged from the "medium" to the "very heavy" physical demand category.

Failure rates 99% confidence intervals (CIs) for BP cut points demonstrated that selection based on general health risk as opposed to guidelines associated with imminent threat impacted failure rate. Using systolic BP and diastolic BP data points, failure rate (99% CI) increased from 1.74% (1.66, 1.78) using the most liberal cut points to 39.31 (39.07, 39.55) using



cut points associated with recent health risk guidance. Failure rates reduced when second or third trials were used following brief periods of quiet sitting.

Although mean arterial pressure (MAP) may not be widely used in outpatient settings, it was investigated in this study since the methodology is often considered to reflect the ongoing dynamic state of physical blood pressure conditions within the cardiovascular system where more time is spent under diastolic blood pressure (DBP) conditions compared to systolic blood pressure (SBP). Mean Arterial Pressure =  $DBP * .333$  (SPB-DBP). Use of MAP based cut points resulted in lower failure rates compared with conventional SBP or DBP cut points.

The impact of body mass index (BMI) was also compared with overall pass rates. The BMI of 30.34 (6.50) was observed in individuals who passed physical and functional testing; compared to BMI of 29.73 (7.39) for individuals who failed either physical or functional testing (N =212,367 and 57,160, respectively).

Physical therapists should use caution in developing test protocols and differentiate criteria predictive of future health risk (often used in health surveillance and consistent with 10 to 30-year risk) versus criteria that indicate risk of adverse events during physical exertion/functional testing (contraindications to testing.) Some screening criteria predictive of the risk of future disease may preclude pre-employment functional testing and unduly restrict job applicants from the opportunity for functional aspects of prehire testing. Multiple trial/reading protocols, use of MAP, and cut point rationale should be considered in test protocol design and support materials.

The full article will be available through open access at <http://journals.lww.com/cptj>

## REFERENCE

1. Daley D, Miller M, Collins SM. Vital signs before pre-employment and functional testing: an observational study. *Cardiopulm Phys Ther J*. In press.

# The Injured Worker

## Work Injury Prevention and Management: Determining Physical Job Demands

Independent Study Course 24.1

An Independent Study Course Designed for Individual Continuing Education

For course detail or to register, visit:  
[www.orthoptlearn.org](http://www.orthoptlearn.org)

# Outcomes in Orthopaedic Physical Therapy Practice

An Independent Study Course Designed for Individual Continuing Education  
Independent Study Course 26.1

## Course Description

This course provides a comprehensive review of commonly used outcome measures in physical therapy practice today. Patient-reported and performance-based outcome measures are covered. The scales and measures are also presented according to their application to the extremity or spine. A unique monograph on cognition and affect is also included. Psychometric and clinical principles are reviewed throughout.



## Continuing Education Credit

**Thirty contact hours** will be awarded to registrants who successfully complete the final examination. The Orthopaedic Section pursues CEU approval from the following states: Nevada, Ohio, Oklahoma, California, and Texas. Registrants from other states must apply to their individual State Licensure Boards for approval of continuing education credit.

Course content is not intended for use by participants outside the scope of their license or regulation.

For course detail or to register, visit: [www.orthoptlearn.org](http://www.orthoptlearn.org)

# PERFORMING ARTS

## SPECIAL INTEREST GROUP

### President's Letter

Annette Karim, PT, DPT, PhD, OCS, FAAOMPT

CSM 2017 was a busy and productive time for the Performing Arts SIG. The PASIG programming, "A Guide to Upper Extremity Nerve Entrapment Syndromes in Musicians," by Janice Ying, DPT, OCS, Adriaan Louw, PhD, PT, CSMT, and Erin M. Hayden, PT, DPT, OCS, was a hit! A big "thank you" to our speakers for teaching us about pain science and sharing their clinical reasoning in the musician cases. The PASIG is already submitting conference and preconference courses for approval for next CSM, thanks to Rosie Canizares, our PASIG Vice President and Education Chair. We are considering collaborations at other conferences and in providing regional continuing education in addition to our work at CSM.

At CSM, the PASIG Fellowship Taskforce met with PASIG members interested in starting a Performing Arts Fellowship. Kendra Harrington was present as the representative for the American Board of Physical Therapy Residency and Fellowship Education (ABPTRFE). The ABPTRFE has approved the PASIG Description of Specialist Practice (DSP) for the performing arts as an area of study. We are now working on final edits with the ABPTRFE to turn the DSP into a Description of Fellowship Practice (DFP). The PASIG will provide the fellowship criteria for accreditation for new fellowships in the performing arts. Several university programs are beginning to create new performing arts fellowships this year. If you are interested in creating a performing arts fellowship, please contact Mariah Nierman or Laurel Abbruzzese. Thank you Mariah and Laurel, for all your hard work in leading the Taskforce and creating the DFP.

Clinicians, academicians, and students interested in dancer screening met for a lively and collaborative session at CSM. Many schools are working on reliability of their pre-professional screens and are willing to share their screens with our members. Please let us know if you are interested in joining this growing group of collaborators. Contact Mandy Blackmon. Thank you Mandy, for doing such a great job of bringing a large group of people with strong opinions on screening together in a productive session.

Our PASIG research grant recipients are Hai-Jung (Steffi) Shih, K. Michael Rowley, and Kornelia Kulig. The team was awarded \$13,998.00 for their new research on flexor hallucis tendinopathies. In June, we released the first funds in the amount of \$8,810.50. The remaining grant funding of \$5,187.50 will be released this year after the 1-year progress report is submitted and approved. Steffi gave a brief report on their work to date at our PASIG Membership Meeting. Thank you Steffi!

Thank you to Amanda Williamson and Hannah Colopy for tweeting and keeping us on social media at CSM! Keep up with us on Facebook by contacting Dawn Doran. It is a closed group, so you need to contact Dawn first. Keep up with us and post on Twitter: We are, PT4Performers. Thank you Dawn for keeping us going! We need social media-savvy folks to join the PR committee. You can do this if you know what Boomerang is!

Congratulations to Ashley Gowen, the PASIG student scholarship winner! Her research was titled, "A Retrospective Analysis of the Pre-Season Screen used in a Professional Ballet Company with Recommendations for improvements in the Screen."

If you are submitting a performing arts poster or platform to CSM 2018, please consider applying for our student scholarship, and contact Anna Saunders, our Student Scholarship Chair. We are glad Anna is serving in this capacity for another 2-year term!

I enjoyed meeting with my Orthopaedic Section 2017 mentee and PASIG member Rebecca Pizarro-Matos. Rebecca, Bonnie Zeiger, my 2016 mentee, and I met and represented our Section and SIG at the Orthopaedic Section booth at CSM. It was great having so many group conversations about residency programs and new frontiers. The PASIG students are welcome to apply through the Orthopaedic Section for formal mentorship from PASIG members. Contact Megan Poll and cc Liz Chesarek if you are interested: [meganpoll@gmail.com](mailto:meganpoll@gmail.com)

We welcome monthly citation blast writers, students included! To do this, you find a topic of interest, then 10 article abstracts from the past 5 years, and write a couple of paragraphs explaining your interest and findings. That is it, so easy! Contact Laura Reising for more information.

If you have an article that you would like to submit for publication in the PASIG pages of *Orthopaedic Physical Therapy Practice (OPTP)*, please contact me (Annette Karim). The *OPTP* is published 4 times a year. We are seeking clinically-focused article submissions. This can be case reports, literature reviews, research reports, and clinical pearls. Author instructions can be found at:

[https://www.orthopt.org/uploads/content\\_files/Downloads/OPTP/OP\\_Instructions\\_to\\_Author\\_3.16\\_FINAL.pdf](https://www.orthopt.org/uploads/content_files/Downloads/OPTP/OP_Instructions_to_Author_3.16_FINAL.pdf)

PASIG membership is free to all Orthopaedic Section members, one of the great perks of being in the Orthopaedic Section! To become a PASIG member, go to this link: [https://www.orthopt.org/sig\\_pa\\_join.php](https://www.orthopt.org/sig_pa_join.php)

If you are already a member, please remember to update your membership:

[https://www.orthopt.org/login.php?forward\\_url=/surveys/membership\\_directory.php](https://www.orthopt.org/login.php?forward_url=/surveys/membership_directory.php)

Please consider sharing your ideas. We are always looking for members who would like to become more involved. Every voice counts.

Clinicians who have an affiliation available for DPT students and are interested in the performing arts, please contact Rosie Canizares. She is updating our website list.

The PASIG leadership has contributed to other performing arts conferences in content, such as scientific presentations, educational, and movement sessions at the International Association of Dance Medicine and Science (IADMS) and Performing Arts Medical Association (PAMA). We will represent the PASIG and the Orthopaedic Section, APTA, at the 2017 IADMS conference in Houston later this year.

I am back as PASIG President for another 3 years! Thank you

for voting for me; but I am looking to you to grow into leadership in the PASIG! These are exciting times, with performing arts fellowships, pre-professional dancer screening development, alternative continuing education considerations, and new performing arts research.

Welcome Andrea Lasner, as our new Nominating Committee Chair; Brooke Winder, Nominating Committee member; Janice Ying, ISC Chair; and Megan Poll, Secretary.



Janice Ying, Rosie Canizares, Annette Karim, Mandy Blackmon, Andrea Lasner, & Laurel Abbruzzese at the PASIG Leadership Meeting.



Adriaan Louw, Janice Ying, and Erin M. Hayden before their presentation to the PASIG at CSM 2017.

## Performing Arts SIG Officers



Annette Karim, President	2017-2020	akarim@apu.edu
Aimee Klein, Orthopaedic Board Liaison	2015-2018	aklein1@health.usf.edu
Rosie Canizares, Vice President/Education Chair	2016-2019	Rcc4@duke.edu
Andrea Lasner, Nominating Committee Chair	2015-2018	alasn1@jhmi.edu
Jessica Fulton, Nominating Committee	2016-2019	jessicafultondpt@gmail.com
Brooke Winder, Nominating Committee	2017-2020	brookerwinder@gmail.com
Elizabeth Chesarek, Membership Chair	2016-2018	echesarek@gmail.com
Laura Reising, Research Chair	2016-2018	lbreising@gmail.com
Mariah Nierman, Fellowship Taskforce Chair, Practice Analysis Coordinator	2016-2018	mnierman@orthopedicone.com
Laurel Abbruzzese, Fellowship Chair Asst.	2016-2018	La110@cumc.columbia.edu
Dawn Muci, Public Relations Chair	2016-2018	Dawnd76@hotmail.com
Amanda Blackmon, Dancer Screening Chair	2016-2018	mandydancept@gmail.com
Anna Saunders, Scholarship Chair	2017-2019	annarosemary@gmail.com
Janice Ying, ISC Chair	2017-2019	JaniceYingDPT@gmail.com
Megan Poll, Secretary	2017-2019	meganpoll@gmail.com



## SPECIAL INTEREST GROUP

### President's Message

Chris Neville, PT, PhD

The FASIG is starting 2017 off with some great new initiatives.

But first, we welcome Jeff Houck as the new Vice President and thank Todd Davenport for his dedicated service over the past 6 years. We also thank Steve Pettineo for his dedicated service on the Nominating Committee for the past 3 years, serving as Chair for the last year. Steve Paulseth is filling the open position on the Nominating Committee.

The Combined Sections Meeting in San Antonio was a great success with ample opportunity to learn and share our experiences in treating and studying foot and ankle impairments.

The FASIG is also dedicated to including more students in our SIG. As part of this initiative, we would like to engage interested students studying in DPT programs across the country to consider being a FASIG Student Intern. The intern will be directly engaged in FASIG events, marketing, and CSM activities. The FASIG leadership is very excited about this opportunity and we look forward to engaging students across our SIG. Please make this opportunity available to students who may be working with you in the clinic or studying with you in the classroom. If you are a student and are interested in the intern position, email Dr. Eric Folmar, at Northeastern University (e.folmar@northeastern.edu). Please include your name, email address, academic institution enrolled in, current year of study, and a one-sentence description of why you are interested in joining the FASIG as a student intern. As always, we welcome your involvement!

Now I would like to introduce Dr. Jeff Houck's synopsis of his CSM 2017 presentation titled, *"Insertional Achilles Tendinopathy: Biomechanical Considerations and Implications for Treatment."*

### Insertional Achilles Tendinopathy: Biomechanical Considerations and Implications for Treatment

Jeff Houck, PT, PhD

This CSM 2017 presentation reviewed current Achilles tendon loading experiments and evolving clinical data associated with insertional Achilles tendinopathy (IAT). The new studies address the relative importance of disease models, impairments associated with IAT and current treatment.<sup>1-12</sup> Recent evidence has progressed significantly for this hind foot problem so readers are encouraged to consult the references.

The talk started with a review of how new Achilles tendon in-vivo and intro-vivo studies support a model of tendon remodeling.<sup>6,10</sup> Ultrasound elastography was used to map the deep and superficial part of the Achilles tendon opposite the posterior calcaneus during weight bearing plantar flexion/dorsiflexion.<sup>6</sup>

The deep and superficial tendon of IAT participants showed decreased tensile and compressive strain, suggesting less deformation to load.<sup>6,7</sup> In-vitro mechanical loading of diseased IAT tissue (removed at surgery) showed decreased compressive strain and increased stiffness (ie, steeper stress strain curve) validating the in-vivo measures.<sup>10</sup> In contrast, to these studies, a study of whole tendon (musculotendon junction to insertion) showed increased tendon compliance.<sup>2</sup> Decreased use and stress shielding by the stiffer diseased tendon near the insertion may explain these findings. These studies motivate therapeutic approaches that (1) decrease compressive loading between the tendon and posterior calcaneus (ie, reducing dorsiflexion) and (2) remodeling of the tendon to handle tensile load.

Latest studies of impairments (ie, ROM, plantar flexion strength, alterations in movement patterns) associated with IAT were reviewed to motivate clinical strategies. Two comprehensive studies using 3D motion analysis to quantify gastrocnemius musculotendon length showed no differences between controls and IAT participants.<sup>8,9</sup> There were differences in dorsiflexion with the lunge test, however, this was highly correlated to VAS pain and VISA-A scales.<sup>8,9</sup> Therefore, the influence of gastrocnemius shortening was not supported. Similarly, there were no differences in isometric peak plantar flexion torque between controls and IAT participants. However, 3-dimensional motion analysis during stair ascent showed patients with IAT used a higher percent of their ankle dorsiflexion range of motion (50% vs 38%). This supported the idea that IAT participants were using a higher percent of their available DF ROM and therefore impinging their Achilles tendon (AT) against the posterior calcaneus. Peak ankle plantar flexor power generation was also significantly lower in IAT participants. Most important, was that both of these alterations in movement patterns were correlated to pain severity (VISA-A). These findings support the therapeutic goals of (1) decreasing the percent of dorsiflexion used during movement and (2) an increase in ankle power production used during movement.

The therapeutic strategies for participants with IAT centered on 3 themes: (1) decreasing impingement, (2) remodeling of tendon, and (3) altering movement patterns. Heel lifts or shoes that bias the foot toward plantar flexion, modifying activities like stair descent, and hill running were seen as critical for controlling compression between the posterior calcaneus and AT. Current evidence suggests heavy slow resistance 3 times per week achieves equivalent outcomes as the eccentric Alfredsen protocol (180 reps/day).<sup>11</sup> A pilot study presented at the conference showed an average of 22% reduction in tendon thickness measured with ultrasound after 10 weeks of a high load eccentric protocol for non-insertional tendinopathy (CSM Poster #2348). A distinguishing feature of this eccentric protocol is the high load achieved. For example, for a 77 kg man, the peak eccentric exercise load during the 10-week program was 400 lbs. Adapting this program for IAT participants who are typically not as active as non-insertional AT is seen as an important challenge. A gradual but consistent increase in force output may be critical. Finally, strategies to ensure carry over to functional tasks were

also emphasized, focusing on decreasing dorsiflexion during movements and increasing ankle plantar flexion power. Because a significant number of individuals with IAT choose elective surgery, new studies were reviewed suggesting that patients choosing elective surgery do better if they have significantly low physical function, pain interference, and depression.<sup>13</sup>

## REFERENCES

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## FOOT & ANKLE SIG OFFICERS

### President:

**Christopher Neville, PT, PhD**

315-464-6888

nevillec@upstate.edu

Term: 2016 - 2019

### Vice President:

**Jeff Houck, PT, PhD**

585-402-0381

jhouck@georgefox.edu

Term: 2017 - 2020

### Research Chair:

**Karin Gravare Silbernagel, PT, ATC, PhD**

kgsilbernagel@gmail.com

### Practice Committee:

**Clarke Brown, PT, DPT, ATC, OCS**

315-986-4655

brownstonept@gmail.com

### Nominating Committee Chair:

**Ruth Chimenti, PT, DPT, PhD**

ruthchimenti@gmail.com

Members: Eric Folmar, Steve Paulseth

# PAIN MANAGEMENT

## SPECIAL INTEREST GROUP

### President's Letter

Carolyn McManus, MSPT, MA

Dear PMSIG Members,

Thank you for the honor and privilege to lead the PMSIG in the role of President. I want to specifically thank Dana Dailey, PT, PhD, for her time, energy and leadership for the past 3 years. We are fortunate to retain her experience in her new position as Research Chair. In addition, our SIG leadership includes Board Liaison, D. Scott Davis, PT, EdD, OCS; Vice President and Education Chair, Nancy Durban, DPT, MS; Nominating Chair, Michelle Finnegan, DPT; and Nominating Members, Craig Wassinger, PT, OCS, and Jacob Thorp PT, DHS, OCS. Special thanks to the service by outgoing board members Anita Davis, DPT, and Joel Bialosky, PT, PhD, OCS.

I am excited to put my passion and experience helping people in pain by serving in the role of PMSIG President. My goal is to help you be the best practitioner you can be. I hope to draw on your talent and experience to help me in this effort to offer our membership evidence-based resources and educational opportunities. CSM 2017 attendance was 11,504 and if programming was any indication of the interest in pain, we are, unquestionably, a hot topic SIG with a large need to meet. CSM 2017 programming included a wide range of courses addressing pain-related topics. These included the PMSIG presentation, co-sponsored with the OHSIG, on the Psychosocial Management of Debilitating Chronic Conditions with Michael Sullivan, PhD. In addition, there were courses offered by the Orthopaedic Section as well as other sections on fibromyalgia, motivational interviewing, pain psychosocial factors in sports, and chronic pain in military and veteran populations, just to name a few. It appears there is no end to the interest in pain!

I want to thank those members who attended our CSM 2017 membership meeting. The meeting minutes and Power-Point are posted on the PMSIG website. As many of you know, the Orthopaedic Section is actively engaged in developing Clinical Practice Guidelines (CPG) to enhance diagnosis, intervention, prognosis, and assessment of outcomes for a variety of musculoskeletal conditions. Nancy Durban, PMSIG Vice President and Education Chair, is a member of the CPG Developmental Group charged with developing these guidelines for chronic pain. At our membership meeting, Craig Wassinger, PT, OCS, provided an overview of the CPG process and invited those members interested in participating in critical appraisals of the literature to provide their name and contact information. Thank you to all those who signed up for this effort. We will reach out to you in the months ahead with additional information. The critical review process will examine the effect of pain education or counseling on the risk of developing chronic pain and, for those patients with chronic pain, examine the role of pain education or counseling on pain levels, function, and quality of life. The CPG Developmental Group previously discussed expanding this scope to include additional physical therapy interventions for chronic pain, including mind body

approaches, but ultimately decided to limit the focus to pain education and counseling. It was concluded that the expanded scope would be too large for a first-time experience of establishing a CPG. Other physical therapy interventions will be included in future CPG development processes. If you are interested in offering your time and expertise to this process but were unable to attend our membership meeting, please contact me. Several members of the chronic pain CPG Development Group will attend a critical appraisal workshop to be held in April at the 2017 Annual Orthopaedic Section Meeting in San Diego. Following that meeting, the next steps in the process include:

- a. Contact individuals to serve as reviewers and secure a sufficient number of qualified reviewers,
- b. Perform critical appraisals,
- c. Incorporate results of critical appraisals to develop recommendations,
- d. Write a manuscript and have it reviewed,
- e. Edit manuscript and final document,
- f. Submit for publication (JOSPT) and to national clearinghouses, and
- g. Develop plan for review and revision to be completed in 5 years.

The preconference and educational session proposal submission deadline has passed, however, the abstract submissions (poster and platform) deadline is June 16, 2017. Visit [www.apta.org/CSM/Submissions](http://www.apta.org/CSM/Submissions) to submit your abstract for poster or platform presentation. If you have questions or need help with developing your abstract submission, please contact Nancy at [Nancy.Durban@cchmc.org](mailto:Nancy.Durban@cchmc.org). CSM programming offers you a great opportunity to share your expertise with your colleagues, so, if you have ideas and experience that can help us improve our treatment of pain, I hope you will submit an abstract.

If you are interested in additional continuing education opportunities in pain evaluation and treatment, visit the Orthopaedic Section's Read2Learn programming at <https://www.orthopt.org/content/education/independent-study-courses/read2learn>. In response to the National Campaign to Combat Opioid Abuse and to provide physical therapists with cutting edge information on pain, the Orthopaedic Section compiled Read2Learn CEU exams based on Dr Kathleen Sluka's popular text, *Mechanism and Management of Pain for the Physical Therapist*, 2nd ed (2016). All you need to do is read the book or book sections and select an online exam option you would like to take. Disclosure: Dana Dailey is a co-author for one of the chapters.

The PMSIG Board has already been brainstorming ideas for 2017. We have been instructed by the Orthopedic Section Board of Directors to complete a strategic plan by CSM 2018. We want to update our website and include a platform where members can contribute reviews of books and research articles. We are planning a newsletter to members that will include this and additional information on upcoming educational and research opportunities. We have set a goal to increase our mem-

bership from 528 to 550 members, so get the word out and invite your colleagues interested in pain to join us!

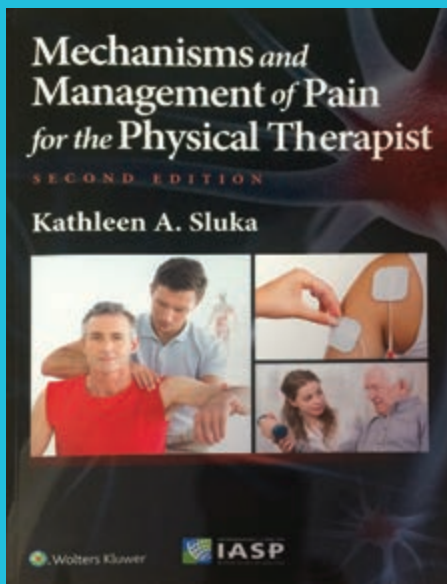
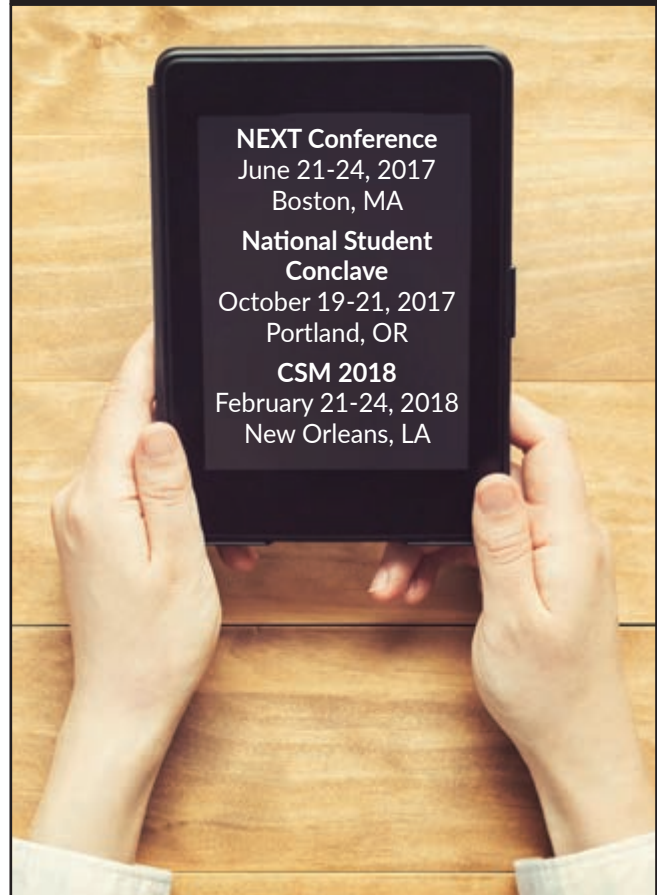
We would like to hear your ideas on how can we improve the PMSIG to better meet your needs. If you would like to write an OPTP article for the PMSIG section, help update our website, establish a Facebook page, or assist in other ways, please contact me. Be assured the Board will take your interest and recommendations into our discussions and planning as we move forward to identify and promote best practice, evidence-based pain treatment. I can be reached at [carolyn@carolynmcmamus.com](mailto:carolyn@carolynmcmamus.com). Thank you again for this opportunity.



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## UPCOMING MEETINGS



## GOT PAIN? Learn From One of the Best Resources

*Mechanism and Management  
of Pain for the Physical  
Therapist, 2nd ed*  
(2016), by Dr. Kathleen Sluka

## Read the Book, Take the Quiz, Get Credit

<http://www.orthopt.org/content/education/independent-study-courses/read2learn>

# IMAGING

## SPECIAL INTEREST GROUP

### CSM2017 PRECONFERENCE COURSE

The preconference course on ultrasonography of common musculoskeletal conditions, led by Doug White, was a success with attendance by approximately 35 practitioners and faculty members. The interest in ultrasound as a supplement to the clinical examination continues to grow across the country, consistent with world-wide trends.

### NOMINATING COMMITTEE

Marcie Harris-Hayes has finished her term on the Nominating Committee by serving as Chairperson and facilitating the election process. Megan Poll was ultimately elected for an entry role on the committee. Marcie has served the SIG well in multiple capacities and we are all grateful for her contributions. Nancy Talbott is now the new Committee Chair. Paul Beattie also serves on the committee. Later this year, the Nominating Committee will be seeking nominations for SIG Vice President. The election will be held in November. Jim Elliott's current term ends immediately after CSM 2018.

### CSM PRESENTATIONS 2017 AND 2018

The SIG sponsored programming at CSM this year consisted of a large cast of characters presenting on imaging models and resources in educational curricula. The presenters consisted of Jim Elliott, Brian Young, Bob Boyles, Becky Rodda, Ira Gorman, and Chuck Hazle.

The proposed programming next year will accommodate the needs of local and state levels as the SIG expands its advocacy role. With imaging in physical therapist practice now beginning to gain momentum, we plan to have practitioners who have referred for imaging and facilitated the process of gaining imaging referral privileges on the institutional and state levels. These topics will include their process of achieving administrative and legislative changes to permit imaging referral privileges for physical therapists. The APTA staff will also contribute, giving updates on the vision of practice for the future and the efforts to realize that outcome.

### RESEARCH COMMITTEE

The Research Committee, headed by George Beneck, continues to move forward with multiple projects relating to imaging in physical therapist practice. In particular, they intend to gather data on the evolution of imaging now becoming available in jurisdictions such as Wisconsin. A portion of this information, including cost and outcome data, may be a challenge to collect and analyze with regard to determining the impact physical therapists are having with imaging privileges.

### SCHOLARSHIP COMMITTEE

The SIG will be starting a scholarship supporting attendance at CSM for accepted presentations relating to imaging. Murray Maitland is the Scholarship Committee Chairperson with several volunteers assisting as they will soon be developing procedures to allow awarding of the scholarship. More on this to come in future issues of *OPTP*. We will also have information about

this scholarship posted on the SIG web pages of the Orthopaedic Section website.

### EXTERNAL PARTNERSHIPS

As of this writing, the SIG is in the process, of developing external partnerships intended to benefit these organizations as well as the SIG and APTA. On an individual level, those most interested in real time imaging are likely to be attentive to these as we continue to move forward. These are still very much in the developmental stages, but have the support of the Orthopaedic Section and the APTA as these efforts continue to evolve. We will have more information about these partnerships in the coming months.

### SIG WEBPAGES

The SIG web pages have recently been overhauled to allow greater visibility of the key documents linked on those pages. Principally, the "white paper" entitled Diagnostic and Procedural Imaging in Physical Therapist Practice and the Imaging Education Manual for Doctor of Physical Therapy Professional Degree Programs are now more accessible. The list of resources for imaging education has also been expanded and is also more easily accessed than in the past.

## Musculoskeletal Ultrasound Evaluation of a Person with Anterior Knee Pain Following a Motor Vehicle Accident

Daryl Lawson, PT, DSc<sup>1</sup>  
Meredith Kelly, SPT<sup>2</sup>

<sup>1</sup>Associate Professor, Department of Physical Therapy, Elon University, Elon, NC

<sup>2</sup>Physical therapy student, Elon University, Elon, NC

### HISTORY

A 53-year-old male was involved in a motor vehicle accident (MVA) on 11/19/15. He attempted to self-manage his pain until 12/9/15 at which time he was seen by his primary care physician secondary to cervical, thoracic, lumbar, and bilateral knee pain on 12/9/15. Radiographs of his cervical, thoracic, and lumbar spine were performed along with an anterior view of the bilateral knees. All were reported to be negative. Percocet was prescribed to manage the pain. Over the next 6 months, the cervical, thoracic, and lumbar pain decreased significantly (2/10). His main complaint upon evaluation was left anterior knee pain. He described the intensity to be 8/10 (0-10 pain scale) with aggravating activities being going up and down stairs and playing with his children. He had a modified Cincinnati knee score of 45, which is evaluated as fair.



## FINDINGS

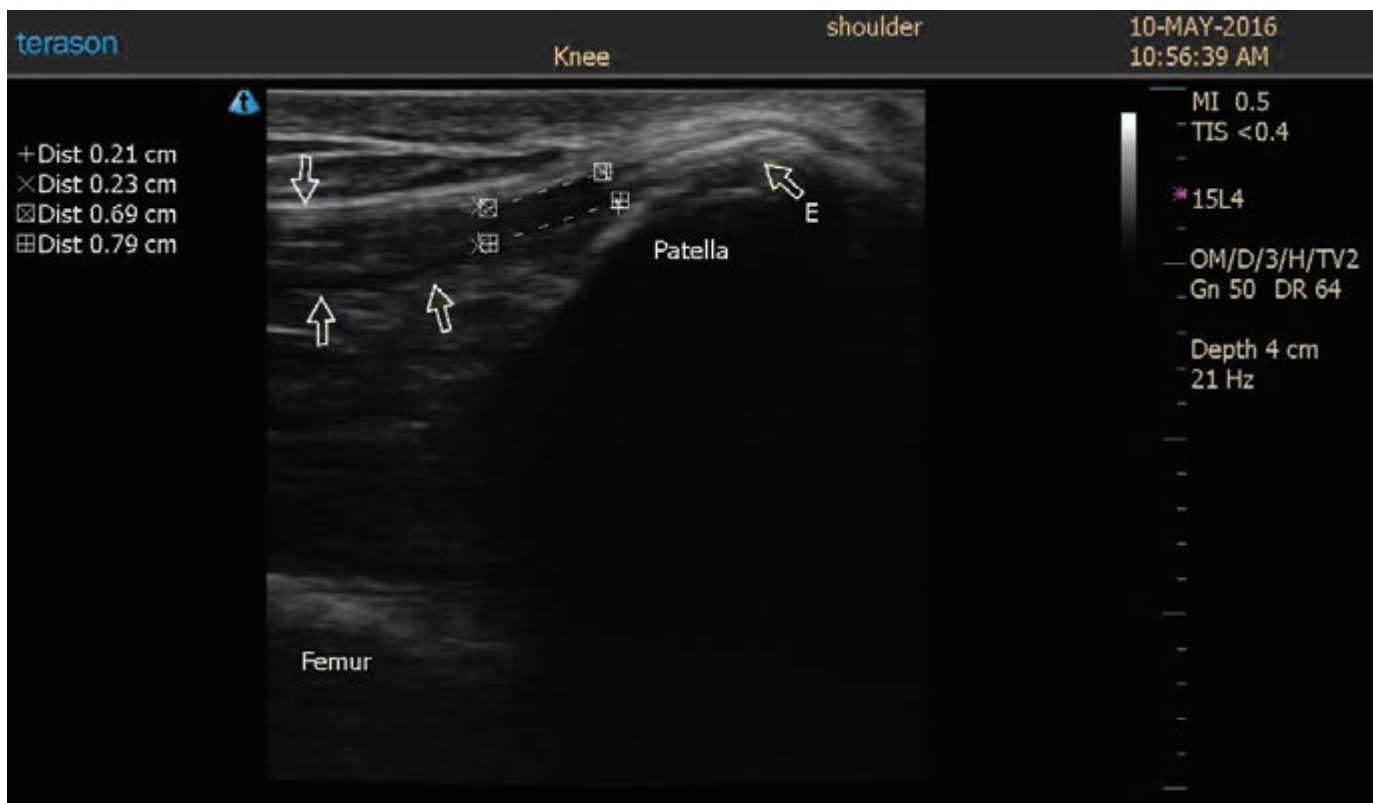
An initial evaluation along with a musculoskeletal ultrasound (MSK US) evaluation was done on 5/3/16. Imaging was done because of the chronicity of knee pain, negative x-rays, and a closer examination of the soft tissue. The MSK US examination followed the European Society of Musculoskeletal guidelines for the knee using a linear, 12 MHz probe.<sup>1</sup> Medial, lateral, and posterior imaging of the knee was performed and was non-remarkable. The anterior image was significant on the left knee for an enthesophyte or bony projection at the insertion of the quadriceps tendon. A mid-substance quadriceps tear was also noted (Figure 1). A normal quadriceps tendon exhibits a multi-layered, laminated appearance that corresponds to the tendon layers arising from the 4 quadriceps muscles. The top layer is the rectus femoris (RF), middle layers are the vastus lateralis (VL) and medialis oblique (VMO), and deep layer is the vastus intermedius (VI). Normal quadriceps tendons may have a laminated appearance with 4 (6%), 3 (56%) or 2 (30%) layers.<sup>2</sup> This case demonstrated a trilaminar quadriceps tear involving the VMO and VL. The mid-substance tear demonstrated clear stumps at the VL and VMO with the RF and VI intact (Figure 1).

The patellar tendon demonstrated a good fibular pattern from the inferior pole of the patella to the tibial tuberosity. Infrapatellar bursa swelling (3.51 cm) was noted distal to the patella (Figure 2). The infrapatellar bursa is located between the posterior tendon surface and the tibial cortex and would not normally display any hypoechoic (dark) image.<sup>3</sup> The hypoechoic image could have resulted from local blunt trauma from the MVA resulting in infrapatellar bursitis.

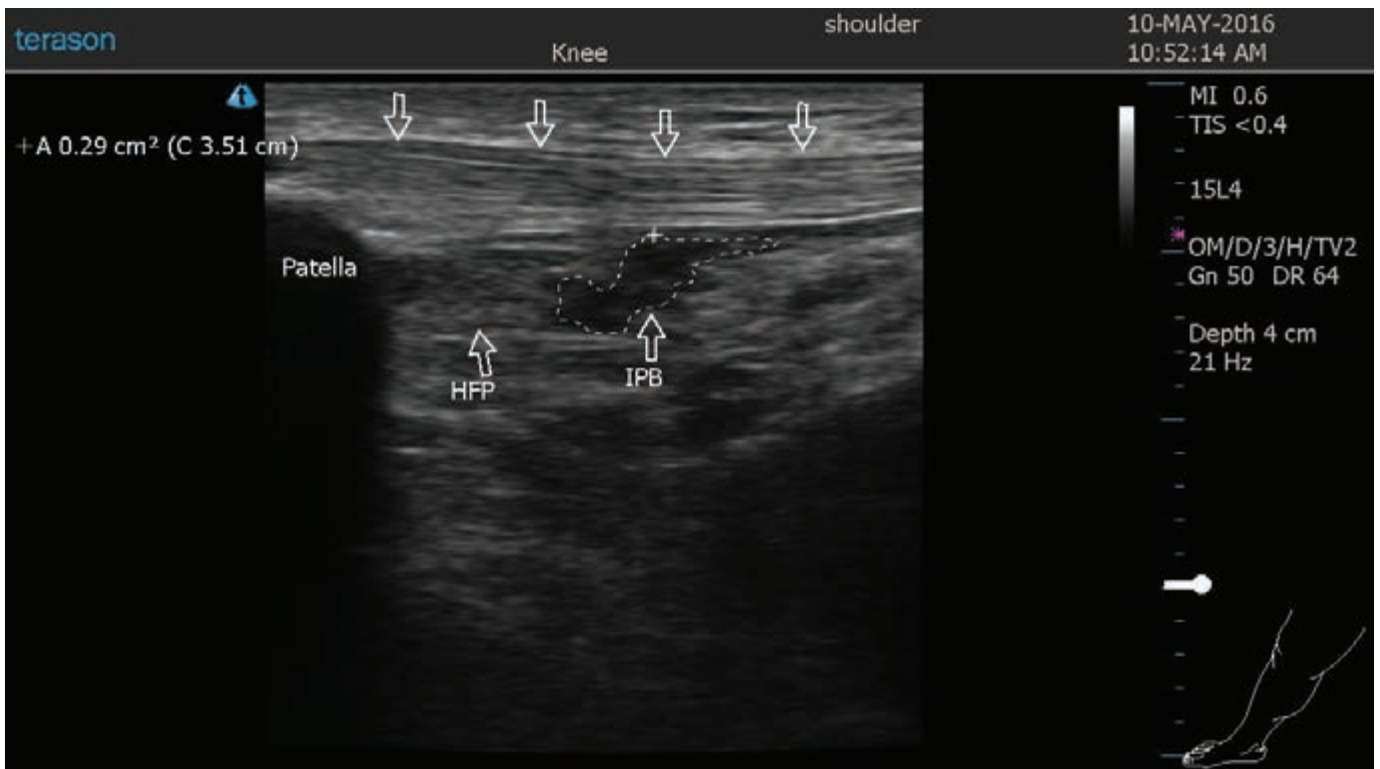
## INTERVENTION

The MSK US examination brought significant psychological relief to this patient as the imaging results corresponded to the location of his pain. He spent since 11/19/15 with left anterior knee pain, negative x-rays, and a perception that his knee should be getting better. The MSK US image confirmed why he was having pain and gave him confidence to begin an exercise program.

Physical therapy intervention started with McConnell taping to the left anterior knee in an inferior medial direction. McConnell taping has been indicated for anterior knee pain and demonstrated to decrease pain.<sup>4-6</sup> Our hypothesis is a minor change in the enthesophyte position may cause a neurophysiological response creating decreased left anterior knee pain and allowing an exercise program to begin. Therapeutic exercise is a powerful modulator of the central nervous system. Activation of the quadriceps may provide the corticospinal input essential for motor unit recruitment and activation.<sup>7</sup> We were also concerned about prolonged inactivity to the fibers of the quadriceps tendon (RF and VI) and possible development of chronic quadriceps tendinopathy. Tendons that are not stimulated with therapeutic exercise can become more disorganized at the fiber level.<sup>8</sup> An exercise program to prevent tendinopathy and decrease pain was targeting at the quadriceps muscles. The program began using exercises that were painfree (short arc quadriceps exercises, straight leg raises, mini-squats) and progressed challenging the quadriceps as the patient could tolerate (knee extension with resistance and squats). An exercise program was also implemented for the hamstrings and gluteus medius (base on impairments from the initial examination).



**Figure 1.** Long axis view of the quadriceps tendon (arrowheads at the left knee). Left side of screen is proximal or toward the quadriceps muscle and right side of screen is distal or the insertion of the tendon at the patella. The square box area is a hypoechoic area demonstrating a mid-substance tear with the distal part of the tear showing the enthesophyte (E) coming off the patella. The RF and VI of the tendon is still intact.



**Figure 2.** Long axis view of the patellar tendon (arrow heads) at the left knee. Left side of picture is the proximal view starting at the patella moving distal toward the greater tuberosity (not captured in the picture). HFP-Hoffa's Fat Pad. IFB-Infrapatellar bursa. Note the IFB is hypoechoic indicating inflammation.

## RESULTS

After 3 weeks, the patient's reported pain at the left anterior knee had decreased from 8/10 to 2/10. He reported being able to go up/down steps with minimal pain. He was able to perform specific exercises of mini-wall squats, elastic band lateral walk, and knee extension with TheraBand, straight leg raises, and short arc quadriceps exercises with minimal pain. His prognosis for a full recovery is excellent.

This case study demonstrates how MSK US imaging helped decrease the anxiety of a person with chronic knee pain and guided our intervention and prognosis.

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# ORTHOPAEDIC RESIDENCY/FELLOWSHIP

## SPECIAL INTEREST GROUP

Dear ORFSIG members,

For those of you who have not yet heard, we can now officially begin to call ourselves the Orthopaedic Residency/Fellowship Special Interest Group (ORFSIG)! The board unanimously passed our petition to move forward as a SIG which will occur at the 2018 Combined Sections Meeting. Looking forward there are a few key items.

1. **Ortho Eblasts:** We recently found out at CSM many of you have not been receiving the Ortho Eblasts.
  - a. Our first remedy to this would be to ensure you are looking for these in your junk/spam email folders.
  - b. The second option is to make sure you follow the Facebook Page. For those of you who do not have a Facebook page please email me (matthaberl@hotmail.com) and let me know as we can consider other forms of communication.
    - i. Join: <https://www.facebook.com/groups/741598362644243/>
2. **Elections:** Now that we are a SIG, the next step is to elect officers which will include a President, Vice President, and 3 individuals for the Nominating Committee. There will be more to come on this in the spring as elections occur in the fall.
3. **ABPTRFE Quality Standards Feedback:** For those who were unable to attend the meeting at CSM. The external auditor hired by the ABPTRFE has completed their review of the accreditation process and are now accepting feedback regarding the new quality standards.
  - a. Make sure you go to the link below and review the complete document. This is Due March 30, 2017, and is completely ANONYMOUS. Because the document is quite large you do have the ability to save and return back to your work along the way.  
<http://www.abptfre.org/QualityStandards;CallforComments>
  - b. Another key item is the **Description of Residency Practice in Orthopaedics**. The first draft was released in 2015 with several concerns from Program Directors and is now cited 5 times within the new document. Please make sure to also provide your feedback regarding the new patient and clinic specific requirements.
4. **2017 Orthopaedic Physical Therapy Practice Publications:** One requirement to moving into a Special Interest Group is to provide quarterly information to all members of the Section in our required SIG reports to *OPTP*. This can be in the form of newsletters or manuscripts. This provides a great option for resident/fellowship programs to highlight some of their internal research or resident/fellowship case studies/reports. Please contact me (matthaberl@hotmail.com) if you would be interested on serving on a review team for our quarterly submissions.

Finally, I would like to extend a special thank you to Aimee Klein, and Pam Duffy our Board Liaisons, Joe Donnelly of the Georgia Chapter and Kathryn Cieslak our Practice Committee Chair along the way as well as Tara Fredrickson, Terri DeFlorian, and all the staff at the Orthopaedic Section Office with the assistance and guidance in making this happen. Thank you again to all of those who could attend the meeting and programming at CSM as well as those who have provided great assistance in the background.

*Sincerely,  
Matt Haberl  
Chair, ORFSIG*

# ANIMAL REHABILITATION

## SPECIAL INTEREST GROUP

### President's Message

Kirk Peck, PT, PhD, CSCS, CCRT, CERP

#### CSM HIGHLIGHTS

A HUGE dose of gratitude is owed to Ria Acciani, MPT, for providing an outstanding and very educational two-hour presentation on manual therapy for the canine cervical spine during CSM 2017 in San Antonio, TX. Attendance of approximately 200 people proved once again that a solid interest in animal rehabilitation continues to grow in the profession of physical therapy. Ria provided a thorough overview of canine cervical anatomy followed by common physical dysfunctions and then shared a variety of clinical videos depicting innovative treatment strategies to restore normal mobility.

In addition to educational programming, SIG officers engaged in dialogue with other SIG leaders, and members of the Orthopaedic Section Board to discuss ideas and vision on the future of our organization. I have communicated to members already regarding some of the key topics covered at CSM, but probably the biggest initiative that will impact the SIG in the near future is the need to conduct a new strategic plan. The goal is to organize at least one focused meeting in 2017 with key individuals to develop an exciting new roadmap for the SIG.

#### SIG PRACTICE ANALYSIS UPDATE

The goal remains 100. At the writing of this newsletter, the number of completed surveys is 55. This is very exciting news, but we still have a ways to go. So if you have not yet completed the ARSIG practice analysis survey please use the following Web link: <https://www.surveymonkey.com/t/DLGN53W>

#### CALIFORNIA VETERINARY MEDICAL BOARD

The California Animal Rehab Task Force experienced an enormous victory in early February with a 10-7 vote in favor of the following motion: "California licensed PTs with advanced training in animal rehab can work under the supervision level determined by the veterinarian on a veterinary premise or an Animal Rehabilitation Facility (which may be on a non-vet premise)." The next step is to advance the approved motion to the Vet Medical Board for discussion and another vote. Although various outcomes are possible, the hope is to use the Task Force's favorable action to drive legislative language in support of PT practice on animals with appropriate regulations to ensure safe and competent standards without hindrance of any direct supervision laws.

#### PROFESSIONAL LIABILITY INSURANCE- ARE YOU REALLY COVERED?

I hear it frequently stated, "I am covered for all of my professional care to animals since I have malpractice insurance." However, reality is not so simple. The fact remains, if the state jurisdiction in which a physical therapist practices on animals does not possess codified laws to support such practice, then malpractice coverage does not exist.

I had a personal discussion with a representative from HPSO

during CSM this year to reaffirm my suspicions. Insurance companies, such as HPSO, will not provide coverage for claims made in jurisdictions where laws do not support the practice in question. Therefore, physical therapists who treat animals, and live in a state where supporting language is void in defining such practice, should personally contact their professional insurance carrier to see if they are covered or not should a claim against them arise.

#### SCHOLARS

To ALL members of the ARSIG, please note that an open invitation continues to exist for all submissions of interest in animal rehabilitation. This is a grand opportunity for therapists or veterinarians to share their knowledge or scientific research findings with the larger community of physical therapists whose common goal is to improve the health and fitness of the animal kingdom.

#### CONTRIBUTORY ACKNOWLEDGMENT

In this edition of *OPTP* an interesting perspective on the use of therapeutic laser to enhance sport performance is presented. Although the studies cited in the article looked at tissue function in only human subjects, there is potential application of findings to competitive sporting dogs and horses.



#### Oh Joy...The Thrill of Spring is Upon Us!!

Contact:

Kirk Peck, President ARSIG  
Office (402) 280-5633

Email: [kpeck@creighton.edu](mailto:kpeck@creighton.edu)

#### ARSIG 2017 RE-ELECTION FOR VICE PRESIDENT/EDUCATION CHAIR

The results of the 2017 election for the ARSIG are in and the candidates were notified of the results. Shortly after being notified, the Vice President/Education Chair-Elect announced that he declined to serve in the office of Vice President/Education Chair. According to Robert's Rules of Order Newly Revised, page 444, this is considered an "incomplete election," not a "vacancy," and requires running another election immediately for the Vice President/Education Chair position.

We are now ready to open the Call for Nominations for the re-election of ARSIG Vice President/Education Chair.

If you are aware of an Orthopaedic Section Member who would like to run for this ARSIG office, please submit his or her name to the Orthopaedic Section office: [tfred@orthopt.org](mailto:tfred@orthopt.org). Additionally, feel free to self-nominate yourself if YOU are interested in running!

# Shedding New Light on the Utility of Therapeutic Laser

Kirk Peck, PT, PhD, CSCS, CCRT, CERP

The storyline is well-known, Einstein applied quantum theory to explain its principles, modern medicine enthusiastically adopted it, and injured tissues in both humans and animals have benefited from its physiological effects. Now some experts claim it may even enhance muscle function and reduce exercise induced fatigue, effects that could have far reaching benefits, including the ability to impact physical performance in the sporting community for both canine and equine athletes. What is the “so called” marvel of interventions...therapeutic laser of course!

Clinical lasers used in rehabilitation are generally classified as either Class IIIb or Class IV. Class IIIb units are known as cold lasers as they do not generate a significant heating response in body tissues. Class IV lasers however can produce significant heating effects and pose a greater risk of tissue damage if not applied with caution. Regardless of laser type, one thing is certain, the more researchers discover about its potential effects on organic tissues, the more excited clinical practitioners become in the field of physical rehabilitation. Not only do the effects of laser increase cellular metabolism, facilitate wound healing, serve as an anti-bactericidal agent, reduce pain and decrease inflammation, but photobiostimulation may also reduce muscle fatigue and accelerate physical recovery following intense exercise.

Researchers in Brazil explored the effects of therapeutic laser on muscle recovery in competitive rugby players through a randomized, double-blinded placebo-controlled study.<sup>1</sup> Twelve competitive male rugby players were randomized into either a placebo or treatment group using a cluster laser probe delivering wavelengths of 905 nm, 875 nm, and 640 nm. Seventeen separate locations on the quadriceps, hamstrings, and gastrocnemius muscles were individually treated with 30 Joules of light energy. Subjects completed a Bangsbo sprint test consisting of 7-maximal sprints of 34.2 (m) in length. In short, the authors found subjects who received laser prior to exercise had improved sprint times, decreased blood lactate levels post-exercise, and decreased perceived levels of fatigue.

Another study by researchers at Georgia Southern University explored the use of laser applied to 6 separate locations on the quadriceps muscles of 34 recreational individuals performing isokinetic knee extensions to fatigue.<sup>2</sup> Laser wavelengths of 660 nm and 850 nm were applied for trials of 30 seconds (1.5 J/cm<sup>2</sup>), 60 seconds (3 J/cm<sup>2</sup>), and 120 seconds (6 J/cm<sup>2</sup>) to the quadriceps muscles of subjects 3 minutes prior to completing eccentric knee extensions to fatigue at 120% of a maximal voluntary isometric contraction. Results of the study indicated subjects who received a dose of laser prior to exercise experienced significantly less fatigue as opposed to those who did not receive the same treatment. Blood lactate levels were not significantly altered during any testing protocol.

Implications of the two aforementioned studies using laser technology as a performance enhancing modality are potentially significant to both the canine and equine sporting industries. Outcomes from both population groups indicate that pre-treating human muscle tissue with laser at various doses and wavelengths can increase muscle function before fatigue, and in some

cases, reduce post-exercise lactic acid accumulation that may in turn accelerate tissue recovery. These findings, if applied with similar parameters to competitive dogs and horses may potentially result in improved performance, reduced time to recovery, and better overall outcomes (Figure 1).<sup>3</sup>

Studies that measure the effects of laser therapy on normal functioning muscle tissues in competitive dogs and horses need to occur before drawing relevant conclusions on the impact to athletic performance. However, the potential implications to improve athletic achievement and reduce the chance of career ending injuries shows promise to a growing industry of sporting animals in the United States.



Kirk Peck and Sharon Classen treating a horse with therapeutic laser before competition.<sup>3</sup>

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