

ORTHOPAEDIC

PHYSICAL THERAPY PRACTICE

The publication of the Academy of Orthopaedic Physical Therapy, APTA

FEATURE:

**Effectiveness of a Standing Workstation
on Perceived Pain & Function:
A Case Series**





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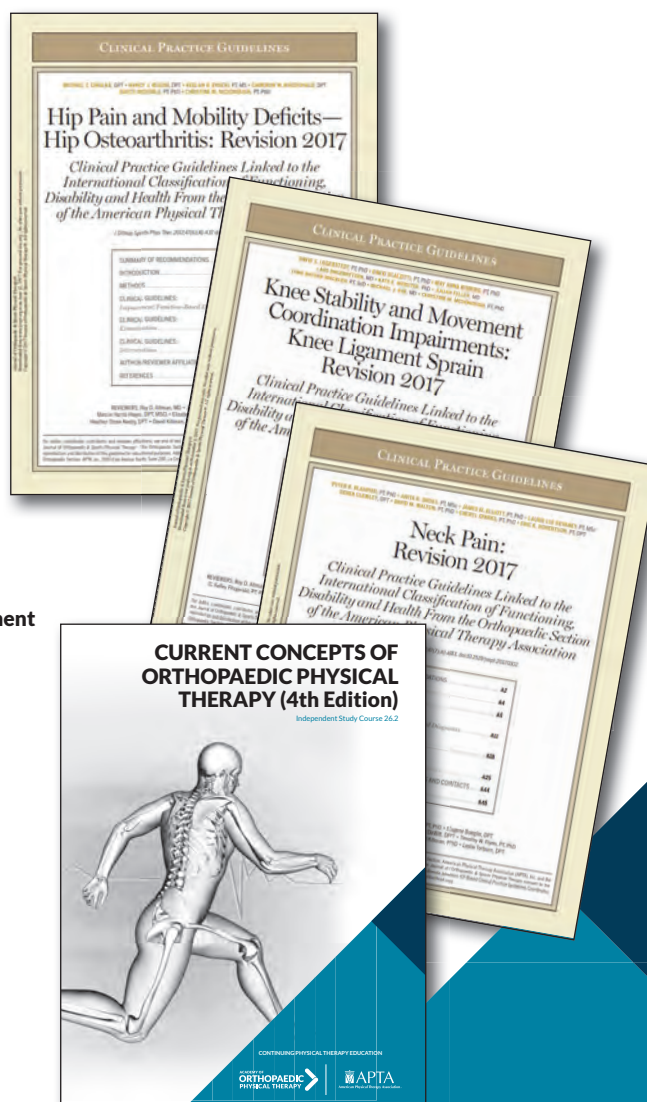
Check out AOPT's Current Concepts & Clinical Practice Guidelines (CPGs)

CURRENT CONCEPTS OF ORTHOPAEDIC PHYSICAL THERAPY, 4TH ED.

ISC 26.2

Topics and Authors

- **Clinical Reasoning and Evidence-based Practice**—Nicole Christensen, PT, PhD, MAppSc; Benjamin Boyd, PT, DPTSc, OCS; Jason Tonley, PT, DPT, OCS
- **The Shoulder: Physical Therapy Patient Management Using Current Evidence**—Todd S. Ellenbecker, DPT, MS, SCS, OCS, CSCS; Robert C. Manske, DPT, MEd, SCS, ATC, CSCS; Marty Kelley, PT, DPT, OCS
- **The Elbow: Physical Therapy Patient Management Using Current Evidence**—Chris A. Sebelksi, PT, DPT, PhD, OCS, CSCS
- **The Wrist and Hand: Physical Therapy Patient Management Using Current Evidence**—Mia Erickson, PT, EdD, CHT, ATC; Carol Waggy, PT, PhD, CHT; Elaine F. Barch, PT, DPT, CHT
- **The Temporomandibular Joint: Physical Therapy Patient Management Using Current Evidence**—Sally Ho, PT, DPT, MS, OCS
- **The Cervical Spine: Physical Therapy Patient Management Using Current Evidence**—Michael B. Miller, PT, DPT, OCS, FAAOMPT, CCI
- **The Thoracic Spine: Physical Therapy Patient Management Using Current Evidence**—Scott Burns, PT, DPT, OCS, FAAOMPT; William Egan, PT, DPT, OCS, FAAOMPT
- **The Lumbar Spine: Physical Therapy Patient Management Using Current Evidence**—Paul F. Beattie, PT, PhD, OCS, FAPTA
- **The Pelvis and Sacroiliac Joint: Physical Therapy Patient Management Using Current Evidence**—Richard Jackson, PT, OCS; Kris Porter, PT, DPT, OCS
- **The Hip: Physical Therapy Patient Management Using Current Evidence**—Michael McGalliard, PT, ScD, COMT; Phillip S. Sizer Jr, PT, PhD, OCS, FAAOMPT
- **The Knee: Physical Therapy Patient Management Using Current Evidence**—Tara Jo Manal, PT, DPT, OCS, SCS; Anna Shovestul Grieder, PT, DPT, OCS; Bryan Kist, PT, DPT, OCS
- **The Foot and Ankle: Physical Therapy Patient Management Using Current Evidence**—Jeff Houck, PT, PhD; Christopher Neville, PT, PhD; Ruth Chimenti, PT, PhD



Additional Questions

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**ORTHOPAEDIC
PHYSICAL THERAPY**

APTA
American Physical Therapy Association



THE LUMBOPELVIC COMPLEX: ADVANCES IN EVALUATION AND TREATMENT

Independent Study Course 28.3

Learning Objectives

1. Demonstrate an understanding of the value of assessing serious pathologies and co-morbidities in managing patients with low back pain.
2. Demonstrate an appropriate interpretation of the patient's history and physical examination findings into patterns that guide the treatment.
3. Recognize acute and subacute low back pain patterns and the rehabilitation that is prescribed for each.
4. Understand the theoretical basis for spinal stability and movement coordination.
5. Formulate a structured evidence-based examination algorithm to identify relevant movement coordination impairments of the lumbopelvic complex.
6. Apply the examination algorithm to develop optimal procedural interventions with regard to proper exercise dosing.
7. Define different types of pain and identify common pain patterns.
8. Describe the relevant clinical anatomy of the lumbopelvic region to allow for accurate clinical examination and identification of possible sources of symptoms.
9. Understand the most common clinical presentations of low back pain with radiating pain conditions to provide a framework for the clinical examination.
10. Understand the basis and progression of neuropathic pain and the development of chronic pain syndromes.
11. Screen for possible sources of low back pain that require medical referral.
12. Use and interpret appropriate psychosocial screening tools to assist in identifying personal factors that influence patient management and prognosis.
13. Integrate research evidence to support the use of manual therapy, including high-velocity low-amplitude spinal mobilizations in the treatment of low back pain with radiating pain.
14. Discuss current evidence for non-pharmacologic and pharmacologic interventions for older adults with low back pain.
15. Identify one or more strategies for incorporating patient-centered care into the plan of care for an older adult with low back pain.
16. Develop an understanding of evidence-based management of adolescents with low back pain and when imaging is indicated.
17. Understand the concepts of exercise progression to prepare a treatment program for an adolescent athlete, beginning with simple, early stage exercises progressing to advanced, sport-specific movements.

Continuing Education Credit

30 contact hours will be awarded to registrants who successfully complete the final examination. The Academy of Orthopaedic Physical Therapy 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.

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Description

This course provides a comprehensive resource for the clinician who seeks evaluation and treatment expertise for patients who suffer low back pain. Particular emphasis is placed on defining the facets governing spinal stability, assessing movement patterns, and differentiating among types of pain and how each is effected in patients with low back pathology. Specific monographs are dedicated to the geriatric and pediatric populations. A unique feature of the course is the inclusion of 39 patient resource pamphlets that can be used for patient education.

Topics and Authors

Acute and Subacute Lumbopelvic Deficits: Lumbosacral Segmental/Somatic Dysfunction—Muhammad Alrwaily, PT, MS, PhD, COMT; Michael Timko, PT, MS, FAAOMPT

Acute, Subacute, and Recurrent Low Back Pain with Movement Coordination Impairments—Won Sung, PT, DPT, PhD; Ejona Jebblonski, PT, DPT

Acute and Subacute Low Back with Radiating Pain—Robert Rowe, PT, DPT, DMT, MHS, FAAOMPT; Laura Langer PT, DPT, OCS FAAOMPT; Fernando Malaman, PT, DPT, OCS, FAAOMPT; Nata Salvatori, PT, DPT, OCS, SCS, FAAOMPT; Timothy Shreve, PT, OCS, FAAOMPT

Low Back in the Geriatric Population—Jacqueline Osborne, DPT, GCS, CEEAA; Raine Osborne, DPT, OCS, FAAOMPT; Lauren Nielsen, DPT, OCS, FAAOMPT; Robert H. Rowe, PT, DPT, DMT, MHS, FAAOMPT

Adolescent Spine—Anthony Carroll, PT, DPT, CSCS, OCS, FAAOMPT; Melissa Dreger, PT, DPT, OCS; Patrick O'Rourke, PT, DPT, OCS; Tara Jo Manal, PT, DPT, OCS, SCS, FAPTA

Patient Educational Resources for the Spine Patient—W. Gregory Seymour, PT, DPT, OCS; J. Megan Sions, DPT, PhD, OCS; Michael Palmer, PT, DPT, OCS; Tara Jo Manal, PT, DPT, OCS, SCS, FAPTA

Supplement: 39 Patient Resource Pamphlets

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ORTHOPAEDIC PHYSICAL THERAPY PRACTICE

The publication of the Academy of Orthopaedic Physical Therapy, APTA

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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.

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I am honored and humbled to have been elected to serve as the President of the Academy of Orthopaedic Physical Therapy (AOPT) (2019-22). The AOPT Board of Directors (BOD) and membership have consistently demonstrated their ability to be leaders and change makers. I believe the President's role is to support the individuals they are leading so they can perform their best work for the Orthopaedic Academy and its members. I like to believe that I am a people person and an organizational leader. What is vital to our continued success is how we do this work together, both collaboratively and respectfully. My pledge to the membership is to lead with transparency absent of personal agendas, free of biases to collectively work toward the Orthopaedic Academy's success in Practice, Education, Research, and Advocacy. I want to thank immediate Past President, Steve McDavitt for his mentorship and willingness to assist whenever and wherever he can in making this leadership transition as smooth as possible. I would also like to thank the current BOD and our operational staff in LaCrosse, Wisconsin, for their patience and support during this leadership transition. These individuals are hardworking and dedicated to the success of the AOPT.

The AOPT 45th anniversary party at CSM 2019 was a great success and all those who attended had a good time. It was a great way to start a term as the new President. Perhaps this could become an annual event at CSM. We would love to hear from the membership if this is something you would find helpful to get to know and socialize with your colleagues. During the event, Steve McDavitt asked me to share some of my initiatives with the membership. In no particular order they were:

1. Assess clinical practice guideline implementation and utilization at the grass-roots level. Identify potential barriers to implementation and what we can do to make the transition less burdensome and less threatening.
2. Leadership development and implementation. The AOPT needs to be more strategic in facilitating leadership development to build the depth and

breadth of leaders in the AOPT and the profession. The Orthopaedic Academy members deserve to have more than one candidate slated for each of the positions up for election in the AOPT.

3. Facilitate the development of a new 3-year strategic direction in October 2019. Input from the membership regarding our strategic direction would be much appreciated.
4. Engagement of DPT and PTA students in the AOPT. Currently, student members represent 6% of the total AOPT membership, and we would like to hear from members, potential members, and students on how we can engage more students in the AOPT.

Over the next 6 months, the BOD will work on developing some immediate best-practices, establish professional norms for effective and efficient communication to promote a healthy culture, and professional excellence. I want to extend a warm welcome to our new *OPTP* Editor, John Heick!!

*Joseph M Donnelly, PT, DHC
Board Certified Clinical Specialist in
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Recently I was reminded that the song by the Talking Heads, *Once in a Lifetime*, came out 38 years ago. Wow, it seems like just yesterday! Instantly, I reflected on that time of my life when I first heard the song. Maybe this happens to you? I remember the very strange video as well. David Byrne, the lead singer, contorts his body and repetitively chants the chorus of “same as it ever was.” If you have not heard the song, I would suggest watching the video. National Public Radio suggested the song is one of the 100 most important American musical works of the 20th century and the Rock and Roll Hall of Fame lists the song as one of the “500 Songs that shaped Rock and Roll.” Apparently, David Byrne disappeared for 2 months to write the lyrics. The lyrics of the song suggest that one is reflecting on life at middle age “letting days go by” while continuously wondering “how did I get here?” Maybe you do this as well as I do.

This year the Academy of Orthopaedics celebrates our 45-year anniversary and it is most definitely not the “same as it ever was.” The enormous changes that have taken place over this time span may seem almost unbelievable to the forward-thinking giants of our profession who kicked off this effort. As a new Editor to *OPTP*, I have had the privilege to learn a small part of this history and I can tell you that our profession owes a lot of respect to Dr. Stephen McDavitt and the Academy’s founders. The slideshow presentation at CSM 2019 was a perfect example of the changes in our profession. This is available on the website at https://www.orthopt.org/uploads/content_files/files/CSMFinal_Past%20President%20Video.mp4.x97p8d2.partial.

If you are like me and are reflecting on ‘how did we get here,’ I believe it is worth our time to reflect on where we came from to understand where we are going. While I cannot do this effort justice in a short editorial page, I encourage our founders and countless others to reflect on this idea and consider submitting an article to *OPTP* so we can all appreciate just how we got here.

While reviewing even just the last decade, our progress is amazing to witness. For example, when comparing CSM 2010 to 2019, the number of posters accepted has increased

from 121 to 223 and submitted platforms have almost doubled in number. Our programming rocks, we continue to fill large ballrooms, and our SIGs continue to expand. Even the business meetings at 0700 fill up the room!

In terms of *OPTP* progression, I reviewed our first newsletter from the winter of 1976 and interestingly, this meeting was also in Washington, DC. The parallels continue, our founding chair, Dr. Stanley Paris, presided at the meeting in 1976 AND was present in 2019. The impact of our profession AND our Academy by Dr. Paris is incomparable, and I am certain that he has countless stories of the progression of the Academy through the years.

As we celebrate our 45-year anniversary and reflect on the “days that go by,” please consider contributing a historical perspective article to *OPTP* that highlights our impressive progression.

Professionally,

*John Heick, PT, PhD, DPT
Board Certified in Orthopaedics, Sports,
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Paris Distinguished Service Award Lecture

The Road to Contributing Gerard P. Brennan, PT, PhD, FAPTA



I want to thank President Stephen McDavitt, the Awards Committee, and the Academy-at-large for this prestigious honor. It is wonderful to be honored with this award, but it is also awkward to receive an individual honor, because everything that I have done has been part of a team effort with great people, learning together, sharing ideas, and friendships. I want to say thank you to some people and then to engage you and especially our younger colleagues for a few moments, so we can think about the Academy and our profession and the road to contributing.

First, I want to thank the two Presidents for whom it was my pleasure to serve. Both have become dear friends: Professor Jay Irrgang and Dr. Steve McDavitt. Dr. Irrgang really got me oriented and helped me understand the Vice President position on the Board. Dr. McDavitt recognized my previous 3 years of experience and really engaged me and trusted me on strategizing during his tenure. I also thank all the individuals with whom I served on the two Boards of Directors over my 6 years as Vice President. I thank Steve Clark who wrote a kind letter of support, and Tom McPoil who really coached me as I got started in the Vice President's role and who assisted me on projects after he had left the Board. I also thank Terri DeFlorian and Tara Frederickson who kept me on task and gave me great support. They are the glue that holds the Academy together.



Having said thank you, I want to speak to the younger clinicians and academics who maybe have not had an opportunity to contribute yet or to get involved in the Academy and/or the APTA because of their own life circumstances. That was me and I can share my story briefly!

I was in my early 40s and I really wanted to be involved, to engage, and to contribute

more professionally, but I also felt a large commitment to being an involved Dad. We had 5 boys and my wife and I are a dual career couple. That was tough back then—and it remains tough now. I was going home to pick up the kids from school at 3 pm, doing soccer, making dinner. This created a tension and stress in me. I was feeling like I was competing with a lot of other people who were still at work getting professional stuff done. But it was difficult to consider leaving to go to a meeting out of town, having to leave these boys at home, or even to spend time at night on conference calls. I also realized that in addition to a desire to be more engaged professionally, I had a personal mission to raise these guys to become good men, gentlemen, respectful of women, and all types of people around them. Turns out, 25 to 40 years later that has become a pretty important issue in our society, and I am glad I put in the time.



But the point here is: It was difficult to reconcile. It required trade-offs.

I just kept working and hoping to develop opportunities and relationships to get more involved in my profession. I was starting to love being a physical therapist. It was not love at first sight. I had to figure it out.

When I think now about talking to my sons or younger colleagues, and they ask me about values or what contributes to success, I tend to center on the concept of **“finding something that you love to do.”** You can't be really good at something that you are

not emotionally attached to. You have to be honest, you have to care, and most of all you need to be really good at listening to others, be willing to help, and recognize opportunities where you can contribute. And, be willing to work and function as part of a team. So much more gets done when we work as a team.

That is why it is absolutely wonderful to be recognized individually and to receive this award. But, in all honesty, I realize whether it was my role in the Academy or at Intermountain working with the University of Pittsburgh or the University of Utah, I have always been a member of a team. We celebrated success together and we supported one another when things did not pan out.

When it comes to functioning as a team, I always relied on Stephen Hunter, my dear friend and colleague for over 30 years. He provided great support and an environment to ask the “what if” questions that translated into our initiatives to improve the quality of physical therapy care at Intermountain, along with the support of every frontline clinician at Intermountain Healthcare. It was the support of Stephen, our colleagues, and Intermountain that provided me the opportunity to contribute without question.

Then I share this great history and support with the University of Utah and Professor Julie Fritz, with whom I have had the opportunity to do so many projects. She has been so supportive, has an incredible mind, and is the nicest person—and what I love about Julie the most, is that she always seems to know the next best question to ask. Also, Anne Thackeray whom I practiced with for years and who has gone on to earn a PhD and has a promising research career at the University of Utah. Thanks to Jake Magel my dear friend and biking buddy who has shared so many great conversations with me. We worked together clinically, and he too went on to earn his PhD. The four of us have enjoyed some great projects together. I also want to thank Kate Minick who has one foot at the University of Utah and one at Inter-

mountain. She has been a great support and has proved to be a great asset to us and is a rising star!

Then, there is the whole University of Pittsburgh family that taught me team work also. Professor and Dean Tony Delitto, who I found to be a great leader, genuine human being, an idea man, and a thinker, who is willing to stretch himself and risk being wrong. Professor Kelley Fitzgerald, who supported us at Intermountain by bringing a great Agency for Healthcare Research and Quality (AHRQ), funded study to us about patients with knee osteoarthritis and the effect of manual therapy, exercise, and booster sessions. Finally, Professor Jay Irrgang whom I really got to know in my work as his Vice President. Jay is a hard worker, he is organized, sees the big picture, always supportive, and a good listener.

The value of your career, the value of your profession, and most important the value of your own happiness depends on the relationships that you build with people closest to you that you love. When you find what it is you love, you are able to bring something extra to your work, to your patients, to your

colleagues, to your family, and to the profession of Physical Therapy. You stay engaged, you succeed together with those around you. You move forward in this journey, and it feels and works better when you have relationships and feel part of a team. We are all connected as physical therapists. Connected in the sense that each of us wants to feel valued, and to provide value to our patients.

The next horizon in our professional lives is to demonstrate the value of physical therapy to health care in America because the playing field is changing. Everyone in health care recognizes that. Everyone has to be engaged. Everyone has to contribute to the extent that they can.

That is why I am asking you, the next generation of Physical Therapists, to gauge your responsibilities and commitments to yourself and your loved ones, **BUT** not to forget the importance of contributing to this great organization and profession, **NOT** because it is easy but because it is hard and because it is a challenge you are willing to accept.

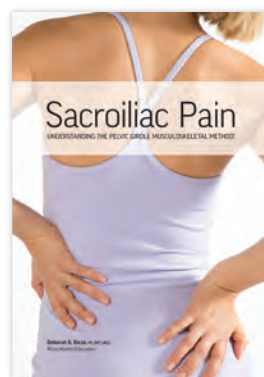


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Effectiveness of a Standing Workstation on Perceived Pain and Function: A Case Series

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ABSTRACT

Background and Purpose: Cervical and lumbar spine impairments are considered two major causes of decreased productivity and lost work days. Sustained and unsupported sitting positions have been related to increased spinal pain and disability. Adoption of adjustable workstations has been found to increase standing time, which may lessen the negative effects associated with prolonged sitting. **Purpose:** The purpose of this case series was to investigate the effects of an adjustable workstation on neck and low back pain and disability in 4 subjects. **Methods:** Subjects used a standing workstation for 8 weeks (intervention). Perceived pain was assessed pre-, during, and postintervention using a Visual Analog Scale (VAS). Function was assessed pre- and postintervention using the Oswestry Disability Index (ODI) and/or Neck Disability Index (NDI). **Outcomes:** In this limited sample, the increase in standing time resulted in decreased pain and increased function in all 4 subjects.

Key Words: back pain, neck pain, ergonomics, posture

INTRODUCTION

As occupations have become more sedentary, the time working adults spend in prolonged seated positions has increased.¹ Low back and neck pain have been cited as the most common complaints among employees in sedentary worksites and these impairments often result in lost workdays. Sprains, strains, tears, soreness, and pain are among the most frequently cited complaints in workers.² Stewart et al³ showed that back pain was the most frequent cause of missed workdays. In a prospective study, Gerr et al⁴ found that those using a computer for more than 15 hours per week were affected by musculoskeletal pain symptoms, with a large proportion of disorders occurring in the neck or shoulder.⁴ The Bureau of Labor statistics reported that musculoskeletal disorders accounted for 32% of all injury and illness cases in 2014.⁵

Prolonged sitting without changing positions, such as in the case of computer use, has been shown to be related to an increase

in pain and disability in the neck and back.⁴ As increasing numbers of people use computers for their jobs, there is an increase in time spent in seated positions throughout the day.

Several studies have examined the effects of interventions in the occupational setting on musculoskeletal disorders where the majority of the research implemented ergonomic education programs and adjustable workstations to reduce musculoskeletal disorders.⁶⁻⁸ From an ergonomic standpoint, researchers provided education and counseling to improve posture and ergonomics at work.^{7,8} Pronk et al,⁶ Neuhaus et al,⁷ and Dunstan et al⁸ investigated changes in sitting and standing habits.⁶⁻⁸ Results indicated that incorporating an adjustable workstation increased standing time.⁶⁻⁸ To address the concern that using a sit-to-stand desk might decrease productivity, a study by Chau et al⁹ found that using sit-to-stand desks in a call center did not reduce productivity.⁹ Adjustable workstations are gaining popularity to address the consequences related to prolonged sitting, Chau et al⁹ in a systematic review indicated that more research is needed to investigate the relationship between reduced sitting and health.¹⁰

A review of previous research did not indicate a focus on the effects of using an adjustable workstation on decreased complaints of pain and perceived level of function.

The purpose of this case series was to investigate the effect of using an adjustable workstation on neck and low back pain and function in 4 people. Our hypothesis was that the implementation of an adjustable workstation would decrease sitting time, decrease pain, and increase function.

RESEARCH DESIGN

The Daemen College Human Subjects Research Review Committee approved this study in March 2015. This experiment was a case series. The independent variables were standing time (pre-adjustable workstation, post-adjustable workstation). The dependent variables were pain ratings, Oswestry Disability Index (ODI) and Neck Disability Index (NDI) scores.

This study evolved from professors describing pain in the neck and back related

to sitting at work. Ultimately these musculoskeletal complaints lead to a think tank grant that awarded 4 faculty members an adjustable workstation. The adjustable workstations facilitated the ability of the professors to change their positions from sitting to standing throughout the day.

METHODS

Four faculty members from the Natural Science department at a small liberal arts college in western New York State who complained of either neck and/or low back pain volunteered for the study. Inclusion criteria were: 18 years or older with neck and/or back pain. Exclusion criteria were: recent neck or back surgery within the past 2 years (Table 1).

After signing an informed consent, subjects completed the Visual Analog Scale (VAS) and the ODI and/or the NDI depending on the location of symptoms. The ODI and NDI are functional self-reporting indices. The ODI is comprised of 10 items with associated statements to select which reflect the ability to manage everyday life while dealing with pain. The items include pain intensity, personal care, lifting, walking, sitting, sleeping, sex life (if applicable), and social life. The NDI is a questionnaire similar to the ODI; however, it addresses symptoms related to neck pain and the ability to function. The NDI includes items such as reading and driving. Evidence suggests that the ODI and NDI have an acceptable degree of validity and reliability.¹¹⁻¹³

The VAS has been used in many settings to measure patient symptoms and research indicates that use of this scale is a valid tool.¹⁴⁻¹⁶ The VAS is a continuous scale for self-reporting and consists of a straight horizontal line, with verbal and/or picture descriptions representing the symptom being evaluated. The line is usually 10 cm long and may have markings between the verbal and/or picture descriptions to help guide the patient.^{14,15}

Subjects were provided with and instructed in the use of a Varidesk® PRO PLUS 36". The Varidesk® is an adjustable workstation that can be adjusted for sitting and standing by actuating a lever to raise or

Table 1. Subject Demographics and Pain Location in the Four Subjects

Subject ID	Age	Sex (1=Male, 2=Female)	Pain Location (1=Neck, 2=Low Back)
1	37	1	1,2
2	51	2	1
3	49	2	2
4	40	2	2

lower the workstation. Subjects demonstrated proper use of the Varidesk® PRO PLUS 36" (Figure 1). The subjects were instructed to keep a daily log in which they recorded current pain using the VAS and percentage of standing time while in their office. At week 4 and 8, all subjects again completed the ODI and/or NDI.

DATA

Data were collected from each subject's VAS pain rating scale, ODI, and NDI log sheet. The preintervention VAS score was collected as a baseline and again at weeks 1, 4, and 8. Scores were calculated by averaging 5 business days for a week (Table 2). The ODI and NDI questionnaires consisted of 10 sections scored from 0 to 5 and the total was added and multiplied by 2. The total scores for ODI and NDI ranged from 0 to 100. The higher the score the more severe the disability. Percent standing time was calculated by averaging all reported percentages during implementation of the adjustable workstation. At the start of this case series, percent standing time for all subjects was zero while the subjects were in the office.

RESULTS

Three of the 4 subjects' VAS scores improved from preintervention to week 8 of the intervention (Table 2). The ODI scores collected from the 3 subjects with complaints of low back pain improved from pre- to postintervention (Table 3). The NDI scores collected from the 2 subjects with complaints of neck pain improved from pre- to postintervention (Table 4).

Due to the small sample size, subjects' ODI and NDI scores were compared to normative data. The normative data was taken from previous studies completed by Kato et al¹⁷ and Tonosu et al.¹⁸ The normative score and cut-off value of the NDI to detect neck pain associated with disability, reported by Kato et al¹⁷ was 15. The normative score and cut-off value of the ODI to detect low back

4 and 8 the NDI and ODI scores fell within or below the normative data.

Percent standing time increased for all subjects. The average percent standing time for subject 1 was 73.5%, for subject 2 was 15.8%, subject 3 was 41.1% and subject 4 was 55.9% (Table 5). Interestingly subject 1 started to stand 100% of the time and began to develop foot pain, which resulted in this subject no longer standing.

DISCUSSION

Few studies have been performed to investigate the effects of decreased sedentary time on musculoskeletal pain.

Neuhaus et al⁷ investigated the amount of sitting time between the three groups.⁷ The first group in the Neuhaus study, received a height-adjustable workstation and a series of 5 e-mail messages that encouraged staff to stand up, sit less, and move more. A second

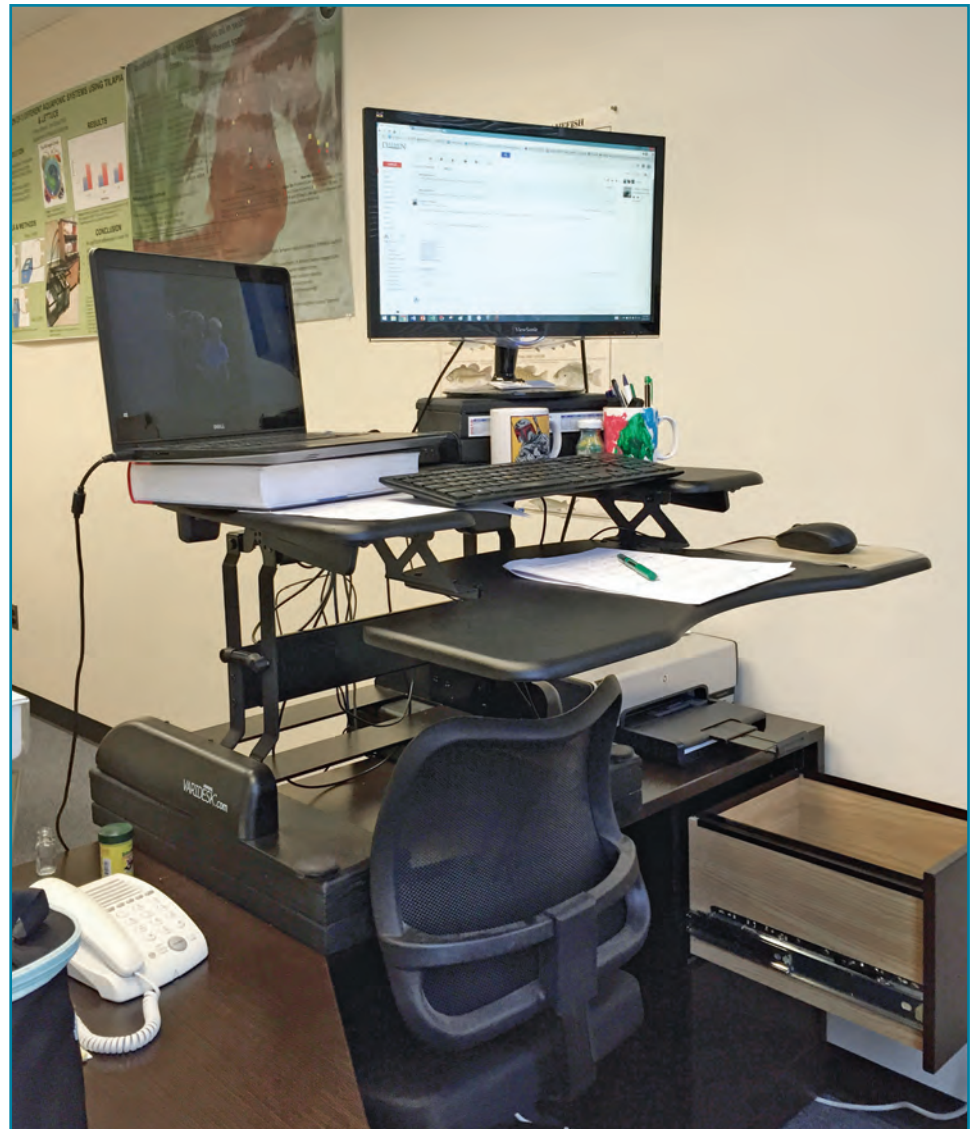
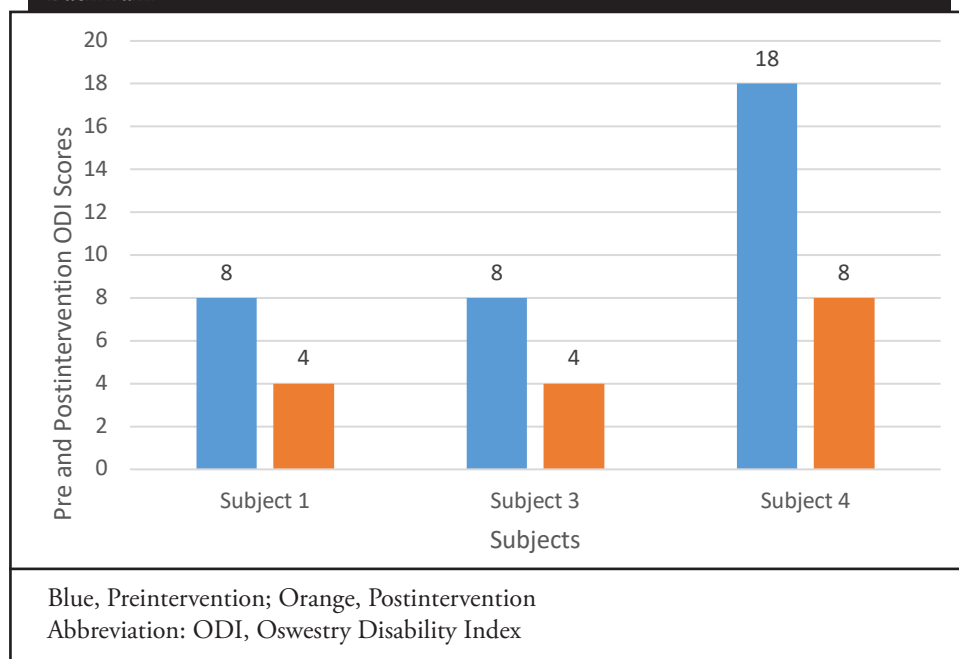
**Figure 1. Varidesk adjusted for standing.**

Table 2. Subject's Visual Analog Scale Neck and/or Back Pain Rating Across the 8 Weeks

Subject	Preintervention	Week 1	Week 4	Week 8
1	0 (neck) 1 (back)	1.2 (neck) 0 (back)	0 (neck) 0 (neck)	0 (neck) 0 (back)
2	6 (neck)	3.6 (neck)	1.6 (neck)	1 (neck)
3	5 (back)	4 (back)	1.5 (back)	3.6 (back)
4	3 (back)	1 (back)	.4 (back)	-

Note: Scores from a Visual Analog Scale rated 0 no pain to 10 the worst pain

Table 3. Pre- and Post-Oswestry Disability Index Scores of the 3 Subjects Reporting Back Pain



group received a height-adjustable workstation with instructions but no further contact. The third group had no workspace modification. Results indicated a greater reduction in sitting time in the first group with comparison to the second and third groups. There was no significant difference in sitting times between the second and third groups. Neuhaus et al⁷ indicated that messages to sit less and stand more along with the use of a height-adjustable workstation, resulted in subjects experiencing a reduction in sitting time. However, change in pain and/or function was not assessed.⁷ The subjects in this

case series reported a reduction in sitting time, decreased pain, and increased function with the introduction of an adjustable workstation alone.

In a study conducted by Pronk et al,⁶ subjects in the intervention group used a sit-to-stand device at work, over a 7-week period. Results indicated a significant reduction in sitting time and upper back and neck pain. These results were similar to the current study findings.

In the current study, subjects reported improved ODI and NDI from pre- to post-intervention and when compared with nor-

mative data. Subjects' pre- and post-ODI and NDI scores also improved along with VAS scores.

This case series supports the use of an adjustable workstation that is consistent with previous research indicating that the use of an adjustable workstation increases standing time.^{8,9} In this case series, an increase in standing time resulted in subjects experiencing a decrease in neck and/or back pain and an increase in function.

CONCLUSION

This case series supports the use of an adjustable workstation that allows people to change their positions from sitting to standing throughout the work day. Complaints of low back and neck pain in all subjects decreased with the use of an adjustable workstation, while function, as measured by the ODI and/or NDI, increased with the use of an adjustable workstation. The symptoms reported by subject 1 suggest that spending 100% time in one position in either sitting or standing may not be well tolerated and may impact function. Increased evidence to support the use of an adjustable workstation may provide evidence for financial support for use of adjustable work stations.

There were several limitations of this study. One limitation is that this was a case series and a sample of convenience that limits the ability to generalize the results to a population. However, the results from this case series may provide a foundation for future research investigating cost savings in musculoskeletal injury with relation to the use of an adjustable workstation. Another limitation is the general inclusion criteria of subjects 18 years or older with neck and/or back pain. Exclusion criteria were recent neck or back surgery within the past 2 years. More specific diagnoses in sampling (ie, cervical stenosis, scoliosis, etc) may yield different results.

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The views expressed in the submitted article are the views of the authors and not an official position of Daemen College.

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Height-adjustable workstations were provided by VARIDESK (www.Varidesk.com).

Table 4. Pre- and Post-Neck Disability Index Scores of the 2 Subjects with Neck Pain Complaint

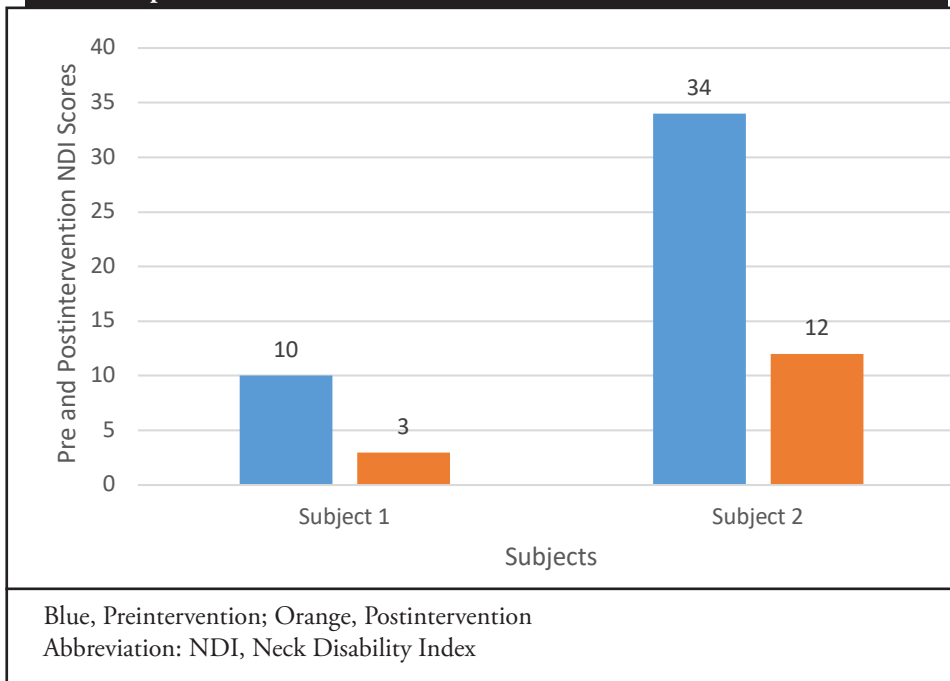
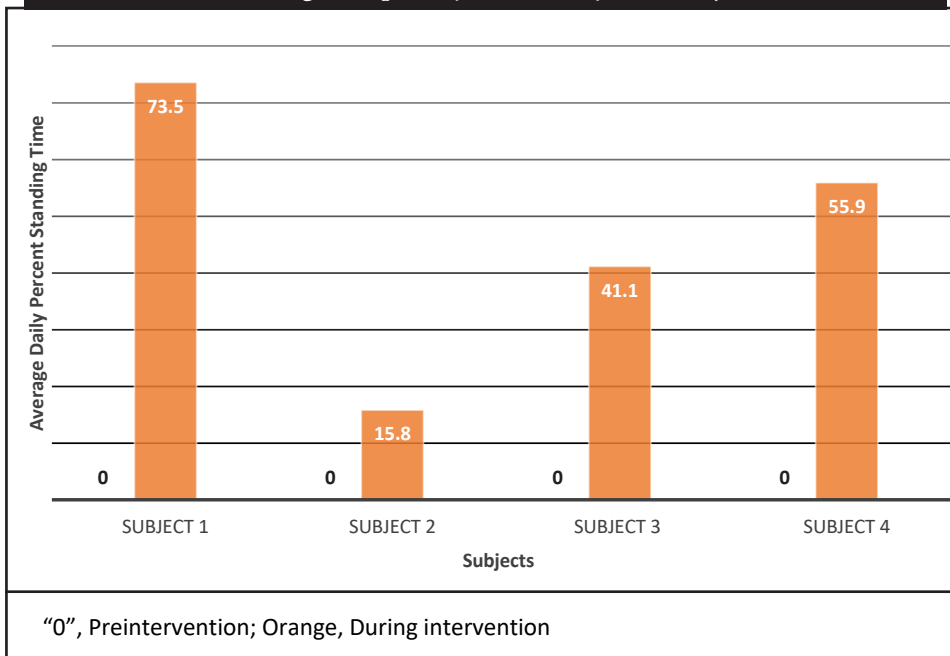


Table 5. Percent Standing Time per Day Estimates by the 4 Subjects



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(Continued on page 83)

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ABSTRACT

The management of chronic pain has become a hot topic of discussion among health care providers. Patient education has a significant role in improving patient self-efficacy and functional capacity, but providers often find themselves at a loss with this difficult to treat patient population. Through this perspective, the authors provide evidence for pain to be viewed as its own specialized sensory system. In doing so, a comparison is made between pain and other sensory systems to demonstrate the relationship between sensation and perceptual awareness at the level of the brain. The term Pain Impairment Syndrome is introduced to better define the sensory-perceptual mismatch taking place in chronic pain states. The inability to properly regulate nociceptive input, what the authors call a 'pain impairment', leads to the symptom cluster often seen clinically in the patient presenting with persistent pain. The authors suggest that using the term Pain Impairment Syndrome and adapting the sensory systems analogy may help draw attention away from the structural bias often perceived by patients and help bring awareness to the biopsychosocial components involved in the pain experience. Ultimately, helping patients to better understand the multi-factorial nature of pain will benefit the patient and provider alike.

Key Words: chronic pain, nociception, pain perception, sensory impairment

PERSPECTIVE

One of the primary functions of the human pain system is to provide awareness to actual or potential tissue damage in order to guide behavior. For physical therapists, pain is often the driving force that determines when people decide to seek care.¹⁻⁴ In chronic pain states, the complexity of pain sensation and perception can be altered in a way that leads to variability in symptom manifestations and physical presentation, thus making clinical management difficult.⁵ Through this perspective, a change in focus to understand the pain processing system as its own specialized sensory system will be suggested. A working model is proposed that views those suffering from chronic musculoskeletal pain as in fact having a Pain Impair-

ment Syndrome involving the peripheral and central nervous system akin to other sensory impairments of the visual, auditory, somatosensory, olfactory, or gustatory systems. The authors will also explore the role of physical therapy in the health care continuum of pain management and education.

Pain as a Sensory System

A broadly acceptable definition of a sense is "a system that consists of a group of sensory cell types that responds to a specific physical phenomenon, and that corresponds to a particular group of regions within the brain where the signals are received and interpreted."⁶ Based on this definition, pain could be viewed as its own sensory system. For example, nociceptors are specialized, high threshold nerve receptors that when activated by noxious physical, thermal, or chemical stimulus transmit the signal to the dorsal horn of the spinal cord.⁷ Although pain is often considered a subset of the somatosensory system, the pathway responsible for noxious stimuli transmission at the spinal cord level is distinctly different from the dorsal column-medial lemniscus pathway responsible for localized light touch, vibration, pressure, and kinesthesia. Once in the dorsal horn of the spinal cord, second order neurons decussate at the spinal cord level and transmit the nociceptive signal up the spinothalamic tract to the thalamus.⁸ Third order neurons then broadcast the signal to various cortical and subcortical regions within the brain, including structures comprising the limbic system, somatosensory cortex, prefrontal cortex, and motor cortex.⁹

In addition to signals from the periphery reaching higher brain centers, the brain is able to facilitate or inhibit nociception through modulatory descending pathways at the level of the interneuron in the spinal cord.^{10,11} The collaboration of these integrated thalamocortical and corticolimbic structures, often known as the pain "neuromatrix," processes input and output signals to influence nociception and pain perception.¹² Factors that drive the response are as unique to each person as his or her thumb print and include anatomic variances, behavior, motivation, beliefs, stress, emotion, coping strategies, prior experiences, and memories.¹³

Pain Impairment Syndrome

Recognizing pain as its own sensory system and understanding the pathways involved make it easier to identify that the human pain experience is truly unique. From a clinical perspective, the neurophysiological changes taking place that perpetuate chronic pain make treatment highly challenging. Just as there can be sensory impairments in the often regarded 5 human senses of sight, smell, taste, touch, and hearing, the pain system can also become impaired. This is a condition the authors term Pain Impairment Syndrome. Relating chronic musculoskeletal pain to other sensory impairments may help simplify the education process for clinicians and make it easier for patients to comprehend discussions of pain neuroscience and treatment strategies. Using the term Pain Impairment Syndrome to describe the overriding presentation of someone suffering from chronic pain also assists in categorizing the multifactorial nature of pain (Figure 1). "Impairment" relates to the altered, diminished, or weakened ability of the nervous system to regulate the nociceptive input. While a "syndrome" is defined as a group of symptoms or characteristic pattern of behavior and actions that tend to occur with a disease or condition.¹⁴ For people suffering with chronic musculoskeletal pain, the term "syndrome" helps identify the cluster of physical, affective, behavioral, and psychological symptoms commonly associated with persistent pain.¹³

It is important to explain to patients that sensory receptors take in the signal but that the associated nerve fibers only send electrical impulses which then need to be deciphered to create an output response. Ultimately, the brain determines what that information means.¹⁵

Consider the following:

- The ear contains vibration and sound receptors that the brain may turn into hearing.
- The eye contains light receptors that the brain may turn into vision.
- The nose contains odor molecule receptors that the brain may turn into smell.
- The tongue contains taste receptors located in taste buds that the brain may turn into taste.

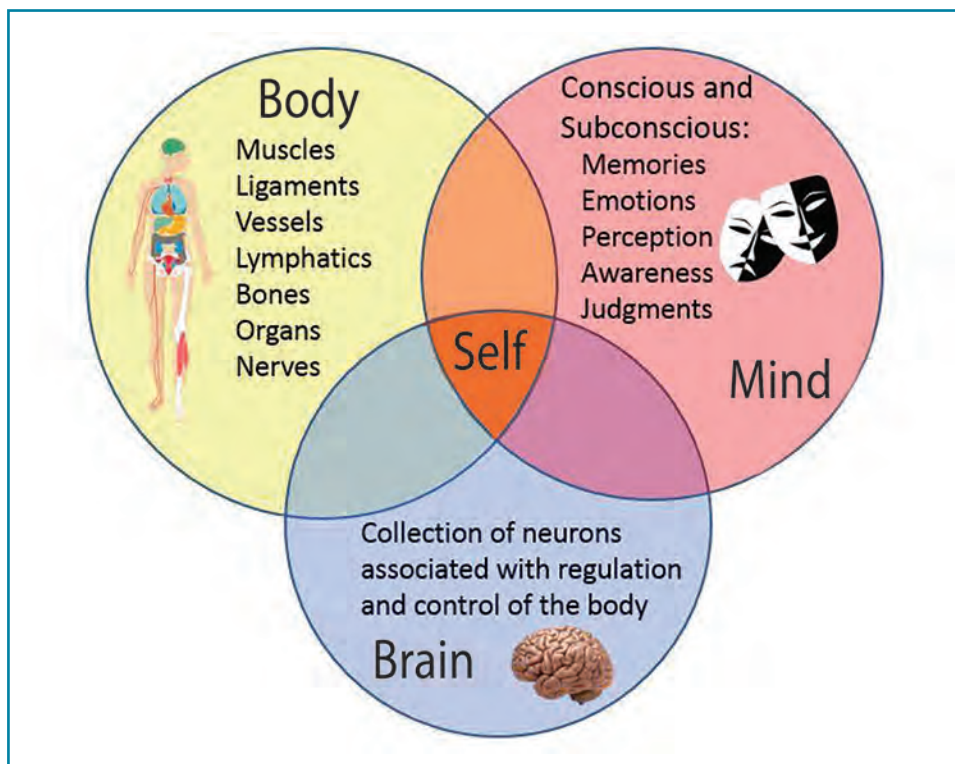


Figure 1. Complexity of Pain Impairment Syndrome demonstrating inter-relationship between the central nervous system, structural variances, and the mind. This multi-factorial nature influences the individual's pain perception, management, function, and quality of life.

- Musculoskeletal structures have nerve receptors called nociceptors that respond to damaging or potentially damaging stimuli, which the brain may turn into pain.

The mechanisms contributing to making the pain “real” or “factual” occur at both a conscious and subconscious level within our mind. The human brain must make very quick determinations about a large amount of data and use various strategies to do so including, semantic networks, categorizations, assumptions, context, and prior experience.¹⁶ Ultimately, if after analyzing the data our brain determines something needs our attention, then sensory input becomes perceptual reality, and pain ensues.

Perception is the process by which we become consciously aware of the sensory information and understand the world. While peripheral sensory systems have a corresponding central perceptual system in the brain, limitations exist in that perception is limited to what information is accessible to the system and to the quality of processing.¹⁶ For instance, the human acoustic sense can only register a narrow band of available frequencies, and this band gets narrower and narrower with increasing age, and hence so

does the ability to hear. Aging also effects visual perception as cells in the retina that are responsible for normal color vision decline in sensitivity, causing colors to become less bright and the contrast between distinct colors to be less noticeable.¹⁷ These examples provide insight into changes in peripheral processing of information to the perceptual centers in the brain. The experience of visual illusions, however, demonstrate top down processing for the visual system and the brain's influence on perception. Awareness and recognition of a visual image is a form of hypothesis testing within the brain. For visual illusions this is based on experience, expectations, prior knowledge, and associations to add meaning to the sensory experience.¹⁶

These facts highlight how perceptual awareness of sensory information can vary between individuals and even within the same individual's lifetime. It is fair to state that we perceive what we know. When it comes to the pain experience, it is no different. Previous research has informed us that “neurons that fire together, wire together,” meaning that neurons that continually interface to create impulses become better adapted to send those impulses through a process known as long-term potentiation.¹⁸

Essentially a mechanism to describe learning through repeated exposure, it adds credence to the proposal that chronic musculoskeletal pain is the result of imprinting, or a learned response that has formed a maladaptive memory that keeps the proverbial wheels spinning in the chronic pain cycle.^{14,19-21} The potential for negative reinforcement of sensation-perception helps to explain the clinical manifestations often experienced by patients living with Pain Impairment Syndrome. This includes physical changes in body image, motor control, tactile acuity, and amplification of sensory input (hyperalgesia and allodynia), as well as catastrophizing thoughts and fear avoidance behavior.^{13,22}

From Theory to Practice

Through this Perspective, the authors propose a change in terminology from chronic musculoskeletal pain to Pain Impairment Syndrome to help bridge the gap between complex pain research, therapeutic interventions, and patient comprehension. Clinically, physical therapists treat physical impairments and disability associated with persistent pain. Physical therapists are also one of the health care providers that have the greatest frequency of interaction with their patients and are therefore well-suited to be leaders in the pain epidemic.²³ Connecting with patients through education helps to change pain-related attitudes and reduce the disability associated with Pain Impairment Syndrome.

Firstly, using the term Pain Impairment Syndrome may assist in de-emphasizing the pathoanatomical structural bias that is associated with the phrase chronic musculoskeletal disorder. As most clinicians working with chronic pain know, interventions based solely on structural pathology yields very poor outcomes.^{22,24} At the same time, referencing a “pain impairment” leaves room in the discussion to acknowledge that the patient's concern for their structural, anatomic changes are real and that they can influence the sensory input entering the pain system. Increasing peripheral transmission may make it more likely that the brain “pays attention” to the input, and a pain output occurs.^{25,26} Furthermore, it is important to remember that “chronic” does nothing more than describe a timeframe, and does not do justice to the complex processes taking place in pain sensation-perception.

Secondly, viewing pain as a sensory system allows for comparison of how other sensory deficits are managed. This will help reinforce to those suffering from Pain Impairment Syndrome that a potential solu-

tion, not a cure, exists for better managing their pain. For example, people that are visually impaired may be able to use corrective lenses; for hearing impairments, hearing aids may be an option; and for people who are in pain, education, cognitive behavioral therapy, biofeedback, relaxation/stress management techniques, and exercise approaches are used to name a few. Moreover, from a physical therapy perspective describing pain as a functioning sensory system helps explain the benefits and substantiate use of our treatment techniques. For example, it has been discussed in previous research that the effect of manual therapy intervention is through neurophysiological effects on the nervous system through an afferent-efferent relationship creating pain inhibition, changes in motor responses, and a reduction in muscular tone.²⁷ Focusing on treatment approaches that address the physical impairments of inactivity and disuse as well as providing interventions to retrain the brain help to reduce the effects of lack of movement, fear of movement, and a belief that all pain is structural and not a function of the brain. The amazing ability of the human body and nervous system to adapt provides a framework for the concept of neuroplasticity and may ultimately provide hope to those suffering with pain.²⁸

The authors' goal is to facilitate a discussion around how the medical community thinks about, classifies, and provides treatment to people living with chronic musculoskeletal pain. We propose that healthcare providers consider use of the term Pain Impairment Syndrome and the sensory systems analogy when discussing chronic pain issues or when engaging in direct individual or group patient education. By shifting the focus away from the ever-looming chronicity of the situation and drawing attention to the multi-faceted nature of pain perception and disability, we may be able to garner better patient understanding and cooperation when working with this often difficult to treat population. Understanding the interplay between the peripheral and central nervous system on pain output will help in reducing the threat associated with pain, the fear associated with movement, and perceived disability. There have been great strides in changing the culture in pain management and the authors' hope is to offer additional resources to improve patient self-efficacy and functional outcomes for those living with pain.

Key Points:

1. Pain acts as its own specialized sensory system with sensory processing influenced by peripheral input and central modulation.
2. Perception of sensory information is needed to consciously experience pain, and is based on a multitude of factors unique to each individual.
3. Pain Impairment Syndrome (PIS) highlights the sensory-perceptual mismatch that can occur in those suffering with persistent pain.
4. Using the term Pain Impairment Syndrome can help clinicians connect to patients while providing therapeutic interventions and education for managing their condition and improving functional outcomes.

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The Acute Effects of Diaphragmatic Breathing on Running Kinematics

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ABSTRACT

Background/Purpose: Despite recent growth of running as exercise, there is a lack of research regarding running mechanics as a means to prevent injury for runners. The purpose of this study was to examine the acute effects of diaphragmatic breathing on running kinematics. **Methods:** Four healthy adult runners were recruited and underwent video capture during treadmill running at baseline, and then with diaphragmatic breathing and without diaphragmatic breathing during warm-up. **Findings:** Statistical significance ($p < 0.05$) comparing baseline to diaphragmatic breathing was found for forward trunk lean and hip extension angles. No statistical significance was found comparing baseline to non-diaphragmatic breathing. **Conclusion:** This study shows that diaphragmatic breathing does have acute statistically significant effects on running kinematics. Acceptable internal validity was determined by finding no statistical significance between baseline measurements between the two randomly assigned groups. **Clinical Relevance:** The results show the potential benefits of incorporating diaphragmatic breathing into a preventative and/or rehabilitation program for the running population.

Key Words: biomechanics, injury prevention, video analysis

INTRODUCTION

Approximately 36 million people in the United States run for recreational or competitive purposes.¹ Despite its popularity, injuries associated with running are common.^{2,3} In fact, the incidence of injury ranges between 18.2% and 92.4% with a prevalence as high as 59 injuries per 1,000 hours of running.⁴ Evidence shows that 40% to 50% of runners will experience an injury yearly.³ Most of these running injuries involve the lower extremity.² The difficulty is in defining what constitutes a running injury, as this is widely debated in the literature. According

to Yamato, Saragiotto, and Lopes,⁵ a running injury can be defined as; “running-related (training or competition) musculoskeletal pain in the lower limbs that causes a restriction on or stoppage of running (distance, speed, duration, or training) for at least 7 days or 3 consecutive scheduled training sessions, or that requires the runner to consult a physician or other health professional.”

Although there is overwhelming research reporting injury prevalence and etiology, there is a lack of evidence discussing injury prevention.^{3,6-9} According to a systematic review of the literature, several risk factors have been identified that increase the likelihood of an injury, such as, greater training distance per week in male runners and a history of previous injuries.² There is some consensus that by limiting the total mileage run may help to prevent injury, however, this is not always a realistic or desirable option.³ One modifiable variable identified in the research to prevent running injuries is to address poor running kinematics.¹⁰ Although this may seem like a simple solution, implementation and adherence can be challenging. Improving kinematics without altering training schedules can be a difficult endeavor. This is especially true since good kinematics is difficult to define and not necessarily agreed upon in the literature.

Kibler et al¹ has suggested that “core stability” is pivotal for efficient biomechanical function to maximize force production and to minimize joint loads in most activities, including running. This ambiguous term of core stability continues to spark debate and controversy in the literature. Simply stated, core stability can be defined as, “the ability to control the position and motion of the trunk over the pelvis to allow optimum production, transfer and control of force and motion to the terminal segment in integrated athletic activities.”¹¹ Despite this definition, agreement is absent on what method(s) are best at improving or optimizing this stability. One possible link in this chain is the diaphragm.

The diaphragm, being the superior boundary of the abdominal cavity, increases intraabdominal pressure when contracted and generates a co-activation of the pelvic floor muscles (pubococcygeus, puborectalis, and iliococcygeus) and transverse abdominus.^{11,12} In addition to diaphragmatic breathing helping to activate the abdominal muscles, it also has been shown to help correct abdominal and chest wall motion, improve chest expansion, and reduce thoracic-type breathing.¹³

Despite lack of agreement in the research linking lack of core stability directly to musculoskeletal injury, inadequate core activation and stability remains a prevalent finding in athletic injury.¹⁴⁻¹⁷ Specifically, patellofemoral pain syndrome, one of the most common chronic injuries in runners, has been found to be partially caused by poor proximal neuromuscular control of the core musculature.¹⁷ With this in mind, it is hypothesized that by improving core activation through diaphragmatic breathing, this may lead to improved running kinematics and therefore be a viable option for injury prevention in runners.

METHODOLOGY

Participants

Participants for the study were recruited through a flyer posted at DeSales University from January 2017 to February 2017. Interested participants were screened for the predetermined inclusion and exclusion criteria. Participants were eligible if they were greater than 18 years of age, ran an average of 8 to 20 miles per week, and were free from any health conditions that had affected their running 6 months prior to data collection. Participants were excluded if they had any non-controlled respiratory conditions, past surgeries, or any health co-morbidities that limited their ability to run for 6 months prior to data collection.⁵ The Institutional Review Board (IRB) of DeSales University approved the study protocol. Participants signed an informed consent prior to participation in the study.

Study Protocol

The study was conducted over a 6-week time frame from February 2017 through April 2017. Four participants were determined eligible to participate and were emailed a description of the study as well as a consent form to review prior to arrival. Participants were provided the opportunity to have any questions answered prior to signing the consent form on the initial day of data collection. Participants were scheduled for 3 sessions on 3 separate days with at least one week between sessions. The first session consisted of a baseline measurement. All participants were then randomly allocated to complete diaphragmatic breathing on either the second or third data collection date (Figure 1). Only one investigator (KR) knew which group the participants were allocated to ensure that diaphragmatic breathing was performed correctly. This investigator was not involved in data analysis. All other investigators were blinded to maintain an unbiased analysis of running kinematics.

Procedure

Each participant began by performing a self-selected warm-up for up to 10 minutes (which could not include diaphragmatic breathing or the use of a treadmill) prior to treadmill gait analysis. Markers were placed on the following bony landmarks; the inferior aspect of the greater trochanter, the fibular head, and the inferior aspect of the lateral malleolus. For consistency, all markers were placed by the same investigator (SG), a licensed physical therapist for each trial. Following placement of markers, blood pressure, heart rate, and respiratory rate were taken to ensure safety prior to running on the treadmill. Data collection consisted of 5 minutes of running on the treadmill with video capture using Dartfish software. All videos were recorded (120 frames per second) with the same iPad Pro mounted on a portable tripod. The tripod was at a distance of 10 feet from the base of the treadmill to capture the participants from the trunk down in the sagittal view. The camera was leveled in both the X and Y axis, however, orthogonality along the Z axis could not be controlled due to set up limitations. The treadmill speed was initially set at 3.0 mph for the first 10 seconds. Participants then increased the speed of the treadmill to a comfortable self-selected pace by the 1-minute mark, which was maintained for the next 5 minutes. Video capture took place at 1 minute 30 seconds and 4 minutes 30 seconds, for 30 seconds each. Following the 5 minutes of running, the treadmill speed was

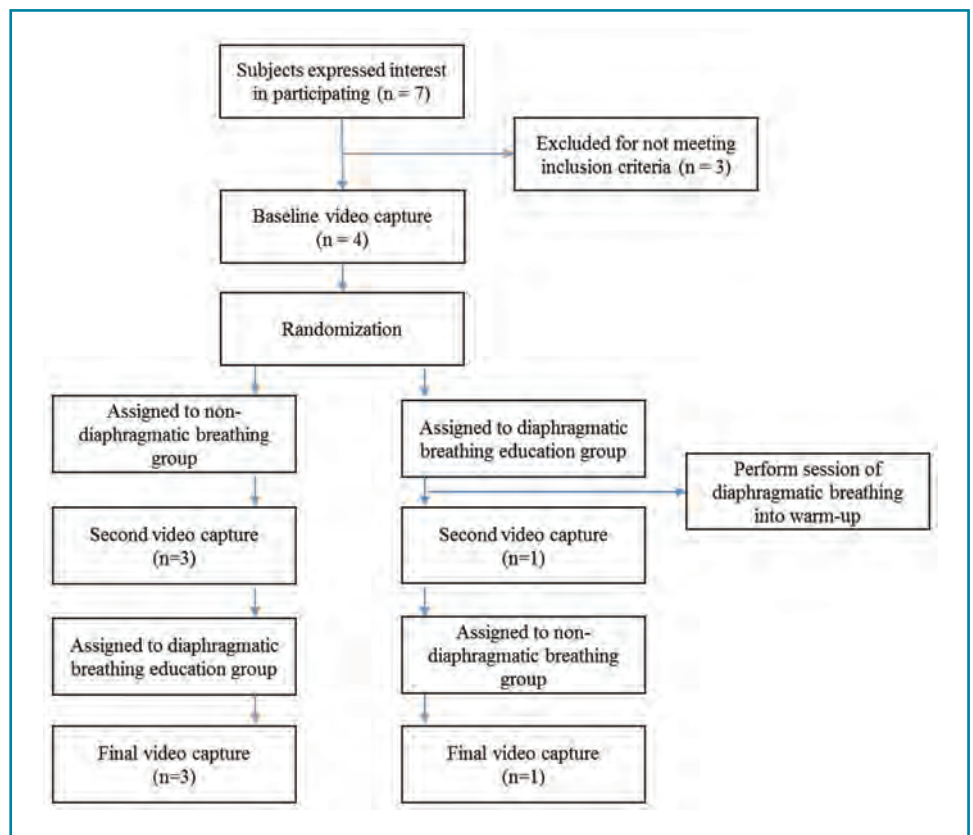


Figure 1. Research flow diagram.

lowered to a walking pace of the participants choosing for 2 minutes to allow for adequate cool-down. Blood pressure, heart rate, and respiratory rate were repeated at the conclusion of the cool-down. Same procedure was repeated for all 3 data collections for each participant. According to Pipkin et al¹⁸ reliable qualitative analysis of kinematic measurements during running can be achieved with video capture. Specifically, high reproducibility of common kinematic variables in the sagittal plane were found, including forward trunk lean and knee flexion angle.¹⁸

Diaphragmatic breathing

Participants were emailed a link to a pre-recorded standardized video explaining the process of diaphragmatic breathing and proper technique prior to the data collection session that included diaphragmatic breathing. Those who were not allocated to this group were simply scheduled to return for a second video capture session. On the day of the data collection that included diaphragmatic breathing, the participants were asked to complete a diaphragmatic breathing protocol that consisted of 2 sets of 6 repetitions of each exercise as described by Cavaggoni et al¹⁹ (Appendix) while under the direct observation of a single un-blinded investiga-

tor. The participant was allowed to ask any questions and was asked to demonstrate the exercise to the investigator to ensure accuracy of the technique. Following diaphragmatic breathing, the participant completed their self-selected standard warm-up.

Data Analysis

All video capture was analyzed using *myDartfish Express for iOS VersionTM 6.0.10523*. Variables for inclusion in analysis were forward trunk lean at initial contact (determined by comparing midline of the trunk relative to true vertical), as well as hip extension at toe off, knee flexion at mid-stance, and ankle plantar flexion at pre-swing (all determined by pre-placed markers described above).²⁰ All gait moments were captured in the sagittal view referenced to the participant's right lower extremity — the limb closest to the camera. Williams and Cavanagh²¹ suggested that running mechanics can be divided into two groups, one examining the entire running cycle, while the other focuses on discrete points. These discrete, or individual, components of running kinematics include hip flexion angle, knee flexion angle, ankle flexion angle, foot inclination angle at heel strike, and horizontal width between center of mass and heel

at initial contact. The joints providing these angles all have an indirect association with the muscle activity of the core.^{1,22} Although there are several different variables that could be measured in terms of running kinematics, Wille et al²² found that 58% of running kinematics could be interpreted using 3 or fewer kinematic variables using the sagittal view.

For each of the 30 second video clips (taken at 1 minute 30 seconds and 4 minutes 30 seconds as described above), the angles were measured at 3 different time points, approximately 10 seconds apart and averaged together in order to approximate the runner's average running kinematics for each trial. The average value for each angle was recorded to appropriately capture any changes that occurred over time throughout the 5 minutes. In order to insure internal validity, the researchers performing video analysis were blinded to the groupings during video analysis.

During video analysis, a single researcher drew angles using the marked bony landmarks on the *myDartfish Express* app on an *iPad Pro* (Figure 2). These angles were then evaluated and confirmed independently by two additional researchers for accuracy. All data analysis was performed using SPSS 23.0 (IBM, Armonk, NY). All variables were analyzed using 2-tailed paired sample t-tests to compare baseline measurements to each of the two test conditions (without and with diaphragmatic breathing). The significance level was set at $\alpha = 0.05$.

RESULTS

Four female participants (mean of 22 ± 0.82 years) met the inclusion criteria for this study. Three individuals were excluded due to an inability to attend follow-up measurement sessions. The average distance run per week was 14 miles (standard deviation of 4.69 miles). Mean degrees of angulation for each of the 4 variables at baseline were compared to both conditions: (1) without diaphragmatic breathing and (2) with diaphragmatic breathing during warm-up. Statistical analysis showed no significant difference among any of the 4 angles measured at baseline compared to measurements taken without adding diaphragmatic breathing (Table 1). However, there were statistically significant differences between baseline when comparing measurements with the addition of diaphragmatic breathing for 2 of the 4 conditions — forward trunk lean and hip extension (Table 2).

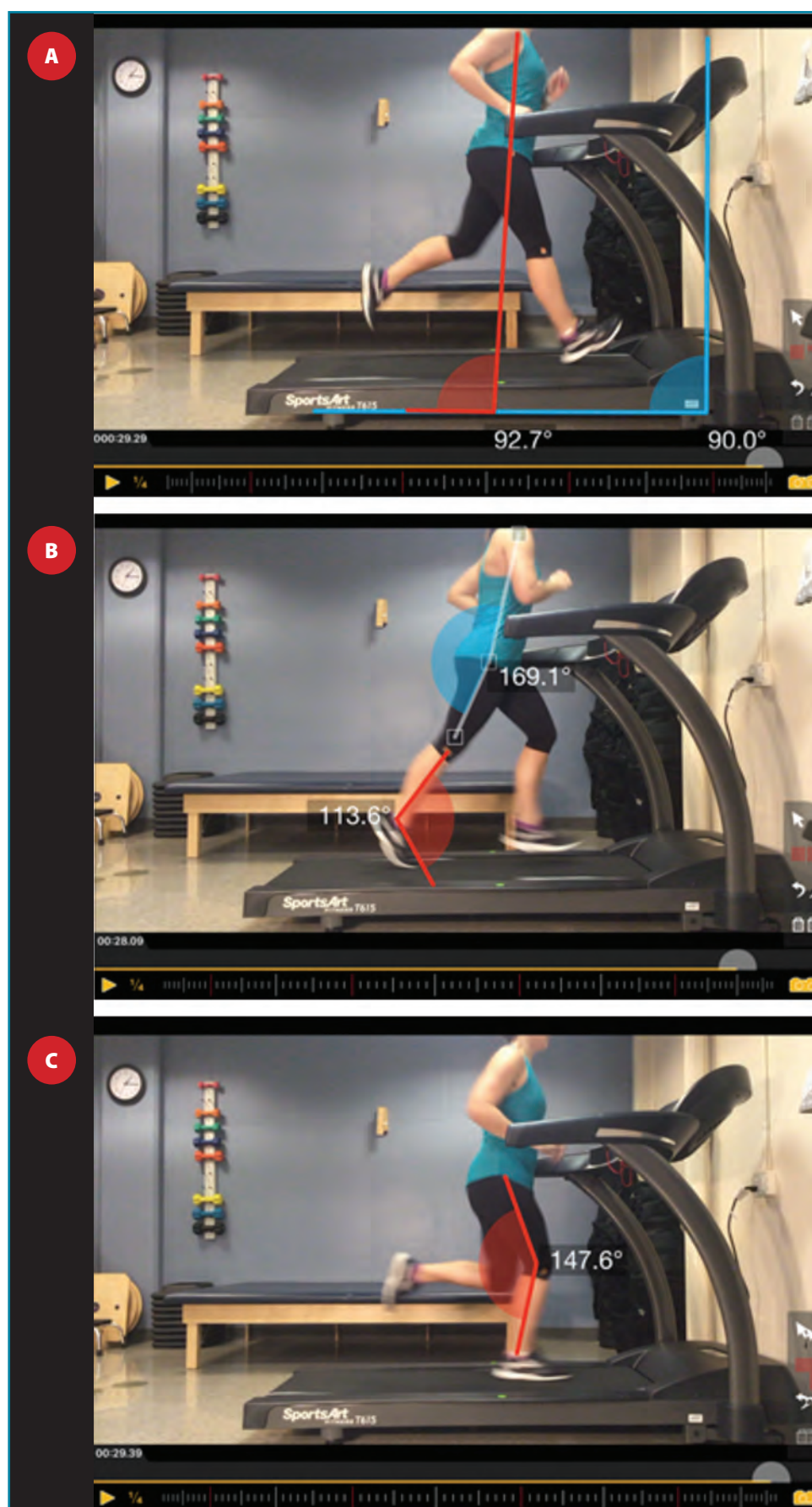


Figure 2. Sample of drawn angles for A, forward trunk lean at initial contact, B, hip extension at toe off, C, knee flexion at mid-stance, and B, ankle plantar flexion at toe off. Angle measures followed anatomical landmarks placed by the licensed physical therapist.

Table 1. Mean Measurements at Baseline and Without Diaphragmatic Breathing of the Runners (n=4)

	Baseline (in degrees)	Without DB (in degrees)	p-value
Forward Trunk Lean	1.38 ± 0.77	1.97 ± 1.22	0.55
Hip Extension	7.54 ± 3.61	4.48 ± 2.14	0.09
Knee Flexion	45.14 ± 5.15	45.4 ± 3.71	0.84
Ankle Plantar Flexion	21.43 ± 4.26	20.67 ± 4.7	0.73

Abbreviations: DB, diaphragmatic breathing; SD, standard deviation

* denotes $p < 0.05$ **Table 2. Mean Measurements at Baseline and After Diaphragmatic Breathing of the Runners (n=4)**

	Baseline (in degrees)	Without DB (in degrees)	p-value
Forward Trunk Lean	1.38 ± 0.77	2.15 ± 0.94	0.02*
Hip Extension	7.54 ± 3.61	4.25 ± 3.43	0.03*
Knee Flexion	45.14 ± 5.15	46.08 ± 4.29	0.38
Ankle Plantar Flexion	21.43 ± 4.26	19.1 ± 3.9	0.39

Abbreviations: DB, diaphragmatic breathing; SD, standard deviation

* denotes $p < 0.05$

DISCUSSION

This study demonstrated that the addition of diaphragmatic breathing to a standard warm-up can result in acute effects on running kinematics at the trunk and hip. No difference was observed when comparing the baseline measurements to the non-diaphragmatic breathing condition measurements for any of the 4 variables measured ($p > 0.05$). This comparison was examined to ensure good internal validity and reduction of the effects of possible confounding variables. Any differences between kinematic variables measured at baseline and after diaphragmatic breathing can be attributed to the addition of diaphragmatic breathing. When diaphragmatic breathing was added to the pre-run warm-up, the participant had an increase in forward trunk lean and decreases in hip extension angles. No change was seen with knee flexion or plantar flexion angles.

Forward Trunk Lean

Running with a slight forward trunk lean has been shown to have the potential to decrease injury. Teng and Powers¹⁷ found that increased trunk lean resulted in a significant decrease in peak stress of the patellofemoral joint (PFJ). Since upright posture (decreased forward trunk lean) during running is associated with greater load at the knees, adding diaphragmatic breathing to a standard warm-up can result in an increase in forward trunk

lean, potentially decreasing injury at the PFJ.

Forward trunk lean has also been shown to decrease resistance with forward momentum, and improve running economy (RE).^{21,23} In contrast to these studies, Hausswirth et al²⁴ reported contradictory findings when comparing a marathon distance run (> 2 hours) to a 45-minute run. The association of decreased VO_2 and increased forward trunk lean may have been due to muscle fatigue or shorter stride length potentially associated with marathon running.²⁵

Hip Extension

Diaphragmatic breathing has been reported by the authors to be assisted by the abdominal muscles, including those muscles that produce hip and trunk flexion (rectus femoris, sartorius, iliacus, and psoas major and minor, gluteus maximus).²⁶ A decrease in hip extension angle in running with the addition of diaphragmatic breathing could be attributed to the increased activation of the core musculature. Although conventional thought points to lack of hip extension being associated with reduced flexibility and reported by authors as not an optimal running form, the ideal amount of hip extension during running remains undetermined.²⁷ It has been suggested by Souza²⁸ that “the required amount of hip extension is not the same for each runner, but related to other characteristics of their running form.”

A decrease in hip extension, specifically at toe-off, has been shown to increase propulsive force, and this increase in propulsion may potentially allow the leg extensor muscles to operate more efficiently.²⁷ Additionally, less hip extension could improve RE by requiring less energy to flex the leg during the swing phase, since it is already partially flexed.²⁷ Royer and Martin²⁹ have previously found that reducing inertial moment decreased mechanical and metabolic demand during the swing phase.

Knee Flexion and Ankle Plantar Flexion

No change was seen in knee flexion and ankle plantar flexion angles with the addition of diaphragmatic breathing. Diaphragmatic breathing primarily effects the core musculature and supporting abdominal muscles, therefore the lack in knee flexion and ankle plantar flexion angles was not surprising. Diaphragmatic breathing was only added to the warm-up followed by an immediate gait analysis, and therefore, changes may not have been observed due to the short span of time before the initiation of the breathing. Earlier diaphragmatic breathing training may be necessary in order to observe change further down the kinetic chain of the lower extremity.

Limitations

Several limitations must be noted that may have influenced the conclusions of this study. The sample size of only 4 participants of one gender is not large enough for generalizability of results. Additionally, the narrow age range between 21 and 23 years of age represents a young subject pool, and cannot be applied to an older population. The video capture for this study was performed only in the sagittal plane. This limited the researchers from observing if there were changes in the frontal plane or vertical excursion. Due to video capture taking place from the shoulders downward, video capture was leveled in both the X and Y axis but was unable to be leveled in the Z axis. Future studies need to investigate multiplanar video capture.

CONCLUSION

This is the first known study examining the immediate effects of diaphragmatic breathing on running kinematics. Although the results of this study are of a small homogeneous convenience sample, the participants showed statistical significance in changes of running kinematics with the addition of diaphragmatic breathing to a standard warm-up. Further investigation of the relationship

between diaphragmatic breathing and running kinematics is warranted.

Clinical relevance

This study was an experimental cross-sectional design to examine the immediate effects of diaphragmatic breathing on running kinematics. The results show the potential benefits of incorporating diaphragmatic breathing into a rehabilitation program for runners. Diaphragmatic breathing can be easily taught to runners, is safe, and may potentially reduce running injuries and improve RE.

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Appendix. Diaphragmatic Breathing Protocol as described by Cavaggioni et al¹⁹

Each exercise is done 6 times for 2 sets:

1. The participant lies supine with legs extended and arms overhead. On inhalation, he or she stretches the arms upward, and on exhalation, produces a sound from the mouth, maintaining the spine aligned and stretched.
2. The participant sits with the spine erect, lower limbs elongated, and arms extended in front of the chest. During exhalation, a vocal sound is produced while elongating the spine more vertically.
3. The participant sits in a kneeling position with the buttocks resting on his or her heels and legs slightly apart; the face is directed forward with the left arm bent overhead. During exhalation, a sound is produced while starting to bend the body laterally and stretching the opposite side of the body.
4. The participant sits in a kneeling position, with one arm bent in front of the eyes and the other resting on the floor. During inhalation, the trunk is rotated to the right while maintaining normal spinal curvature. During exhalation, a vocal sound is produced while keeping the body rotated and elongated.

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Successful Outcome of Prolonged Postpartum Hip Pain with Focused Pelvic Health Physical Therapy: A Case Report

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ABSTRACT

Background and Purpose: Chronic pelvic pain is defined as pain to the pelvis, anterior abdominal wall at or below the umbilicus, or the buttocks. Signs and symptoms of pelvic floor dysfunction include urinary urgency and frequency, stress or urge incontinence, and sexual dysfunction. While these symptoms are common after childbirth, medical attention is required to correct the impairments. The purpose of this case report is to describe a comprehensive physical therapy plan of care for a patient with left buttock/hip pain that was an underlying pelvic floor dysfunction. **Case Description:** The patient is 36-year-old female that presents with left hip/buttock pain 4 years ago after the birth of her youngest child. The patient was seen for 4 months of orthopedic physical therapy with minimal satisfactory results. She had an increase in left hip pain with carrying her daughter and walking down the stairs. She reports exacerbations of pain occurring during running activities in the left buttock. Interventions include manual therapy for internal and external pelvic floor myofascial release, relaxation of pelvic floor muscles, and strengthening of core and hip musculature. **Outcomes:** The patient was seen for 11 visits and reported 90% improvement of symptoms. The patient stated that overall anxiety and stress levels decreased and a reduction in the severity of symptoms. The patient was able to return to her gym protocol. **Conclusion:** This case report is a review of how pelvic floor dysfunction can present as referred pain to the hip and buttocks. The patient was able to decrease her pain levels significantly and return to her gym protocol. All physical therapists should consider the potential of referral of pain from the pelvic floor with onset of hip or buttock pain after childbirth.

Key Words: chronic pelvic pain, pelvic floor dysfunction, piriformis syndrome

INTRODUCTION

The clinical definition of chronic pelvic pain is defined as pain to the pelvis, anterior abdominal wall at or below the umbilicus,

or the buttocks. Symptom severity must be elevated enough to cause functional disability or require medical care.¹ Chronic pain also is multi-factorial and can persist after the original tissue injury due to changes in the neural pathways within the central and peripheral nervous system.² Signs and symptoms of pelvic floor and abdominal weakness with a large diastasis recti, urinary urgency, and minimal stress incontinence are common symptoms after childbirth but are typically due to an underlying pelvic floor dysfunction. A timely referral to a pelvic floor specialist for management of patients with pelvic floor muscle insufficiency following childbirth can result in full functional outcome. It can also prevent prolonged lower back pain symptoms or unnecessary physical therapy interventions used for lower back pain of musculoskeletal origin such as injury, strain, and/or degenerative disease.

Physical therapy, like medicine, encompasses numerous specialties such as Orthopaedic, Sports, Geriatrics, Neurology, Pediatrics, etc. Pelvic health physical therapy is a component of the general women's health field. Given the complexity of the pelvic floor anatomical structures, extensive education and training is needed to assess and treat the pelvic floor. It is common for orthopaedic physical therapists to encounter chronic pelvic pain (CPP) symptoms that mimic low back and/or hip pain in the clinic. For this reason, a good understanding of the structures and related symptoms can facilitate a timely referral for specific management.

CASE DESCRIPTION

The patient in this case is a 36-year-old mother of two children with onset of left hip/buttock pain 4 years ago after the birth of her second child. She was seen for 4 months of standard orthopaedic physical therapy with continuation of symptoms during higher-level activities. A previous bout of orthopedic physical therapy (PT) for approximately 20 visits included strengthening of the transverse abdominus for core stabilization, stretching of the lower extremities, manual therapy to address joint and muscle restrictions, and modalities as needed. The referring physiat-

rist recommended pelvic floor PT to address musculoskeletal dysfunctions of the pelvic region. She previously had referring pain from the buttock to the left great toe that was resolved with outpatient orthopaedic PT. She had an increase in left hip pain with carrying her daughter and walking down the stairs. She reports exacerbations of pain occurring during running activities in the left buttock only without radiating pain. She reports that pain can increase and decrease with activities but unsure what causes the fluctuation of her symptoms. She denies radiating pain or numbness/tingling in her lower extremities.

Patient reports no co-morbidities in her past medical history. She reports a regular menstrual cycle on a 28-day cycle. She reports P2G2 with the birth of her first child via caesarean section and had a vaginal delivery for her second child. She also had a vacuum delivery with stage 2 episiotomy during vaginal delivery. No red flags were found during a review of systems for this patient. The patient did report inconsistent small stress incontinence only with sneezing for 4 years since the birth of her daughter. She reports prolonged urinary urgency with inconsistent and minimal urge incontinence. She reports pelvic pain (unsure if similar as referred pain) with use of a tampon, at her menstrual cycle, sexual activities, and with gynecological examinations.

In the clinic, the patient was presenting with constant buttock pain only. Her pain currently is rated 2/10 on the numeric pain rating scale (NPRS). The worst amount of pain is rated 3/10 on the NPRS and the least amount of pain is rated 1/10 on the NPRS. She describes the pain in her left buttock as dull and achy at rest and becomes throbbing with fatigue during activities. Impact activities, swimming, and carrying her daughter aggravate pain. Self-massage and stretching to the left buttock/hip can decrease the pain temporarily.

Medical diagnoses were ruled out with insignificant radiographic imaging, magnetic resonance arthrography (MRA), and unsatisfactory results to medical interventions. Sacroiliac joint dysfunction is suspected due to unilateral buttock pain and referred pain

into the posterior thigh and lower leg.³⁻⁶ The patient also had localized pain in Fortin's area, a painful region within one centimeter inferomedial to the posterior superior iliac spine (PSIS). This is common with sacroiliac joint dysfunction.⁵⁻⁷ Piriformis syndrome is highly suspected with pain initiating at the middle of the buttock muscle, previous radiating pain without numbness and tingling, and pain with higher level activities that requires an increase in gluteus medius strength.^{8,9} The last musculoskeletal differential diagnosis consisted of chronic pelvic pain due to the over activity of the pelvic floor. The patient reported the onset of pain after the traumatic childbirth and potentially was due to changes in muscle length tension within the pelvic floor. Lastly, the patient reports that an increase in stress and anxiety cause an increase in referring pain. For example, the patient stated that when her extended family came to visit her home she had an increase in her referring pain, despite no changes to her activity levels or function. These symptoms are consistent with chronic pelvic pain caused by myofascial changes.^{10,11}

EXAMINATION

The objective examination began with postural assessment in unsupported standing. The patient demonstrates a flattened thoracic spine with a decrease in thoracic kyphosis and mild increase in lumbar lordosis. The patient also demonstrates an increase in anterior pelvic tilt with her right iliac crest elevated, right (PSIS) elevated and left anterior superior iliac spine (ASIS) elevated.¹²⁻¹⁴ Other noteworthy components of her posture include bilateral genu recurvatum, and bilateral pes planus.

Throughout the examination, external palpation was performed to determine if certain structures and tissues were tender and could cause reproduction of her pain. Referring pain occurred with palpation to the left piriformis muscle, left levator ani muscle, left obturator internus muscles, left PSIS, left sacral sulcus, and left sacroiliac joint (SIJ) long dorsal ligament. This is important to note that reproduction of pain occurred with external palpation of levator ani and obturator internus, as well as piriformis muscle. An increase in tenderness to these muscles are common with over active and spastic pelvic floor muscles. These muscles can be palpated externally through the gluteal tissues, but are fully assessed with internal vaginal or rectal examination. Quality of tissues of the left muscles demonstrated increases in tissue density with increased "awareness" of referred

pain. This is significant due to the musculoskeletal diagnoses that are ruled in and out based off palpation. For example, an increase in pain at the PSIS and SIJ, commonly known as Fortin's area occurs in conditions such as SIJ dysfunction.⁵⁻⁷ Increases in referring pain at the piriformis muscle is part of the clinical criteria for piriformis syndrome.¹⁵ Lastly, referring pain with an increase in tissue density at the levator ani and obturator internus are common clinical manifestations that occur with an over active pelvic floor and chronic pelvic pain.¹

Active range of motion (ROM) of the lumbar spine was within normal limits except for limited lumbar extension and right side-bending. Extension occurred with hinging at L2 and L4 to demonstrate poor motor control and lack of multifidi stabilization at these segments. No pain was noted with active ROM as a clinical finding without reproduction of symptoms. Hip and knee ROM was within normal limits bilaterally and without reproduction of pain.

Manual muscle testing was performed for the lower extremities. Specific strength grades for this patient are provided in Table 1. The patient demonstrated an increase in hip flexion when asked to isolate gluteus medius activation in the testing position. Knee and ankle strength was within normal limits. Abdominal muscle testing was scored via Sahrman lower abdominal strength testing as 1/5 with a neutral spine.⁹ The patient also demonstrated excessive contralateral umbilicus deviation with hip flexion in sitting that is correlated with a decrease in external oblique weakness.¹⁶ Resisted hip abduction of flexed hip (clam shell positioning) caused reproduction of pain on the left side only. It is important to note the reproduction of pain with hip abduction in a flexed hip position is a clinical sign of piriformis syndrome.⁸ It is also common to see muscle imbalances

throughout the lower quarter to change the muscle length tension in the pelvic floor as a source of chronic pelvic pain.^{10,17}

Lumbar special testing was unremarkable with repeated movements not causing changes in symptoms, and unremarkable neurological examination.⁵ Active straight leg raise was rated 0/5 difficulty level bilaterally to demonstrate appropriate force closure and functional strength of the core muscles with a long lever arm.¹⁸⁻²⁰ The patient had a moderate diastasis recti that was measured at 4 cm at umbilicus (abnormal greater than 2 cm), 3 cm separated at 3 cm above the umbilicus and 4 cm separated at 3 cm below the umbilicus. Balance testing was within normal limits during single leg stance (SLS) with bilateral contralateral hip hike noted in stance. Sacroiliac joint cluster testing of SIJ distraction, SIJ compression, bilateral thigh thrust, and sacral thrust test was negative with all tests to rule out SIJ dysfunction.^{21,22} The patient had poor motor control with (-) Gillet's test with contralateral hip hike but appropriate inferior glide of the PSIS compared to segmental level S2.^{23,24} Hip internal derangement testing was insignificant with Scour, flexion, adduction, internal rotation (FADDIR), flexion, abduction, external rotation (FABER), and impingement testing to rule out internal derangement of the hip.^{4,25,26} The patient also had reproduction of referring pain with sidelying flexion, adduction, internal rotation (FAIR) testing for piriformis syndrome to complete the cluster for piriformis syndrome.^{8,15} Lastly, Sahrman's femoral glide was positive for functional anterior impingement due to overuse of hip flexors and a decrease in gluteal strength.⁹

Due to the patient's primary complaint of lateral hip and buttock pain, an internal pelvic floor assessment was deferred until the second visit. The patient was educated on an internal examination and verbal consent was

Table 1. Manual Muscle Testing at Initial Evaluation			
Muscles	Left	Right	Comments
Hip Flexion	4+/5	4/5	No increase in pain
Hip External Rotation	4/5	4+/5	Mild increase in left buttock pain
Hip Internal Rotation	5/5	4/5	Increase in referring pain to the buttock
Hip Extension	4/5	4/5	Lumbar extension noted at segmental level L4 as compensation
Hip Abduction	4/5	4/5	Increase in tensor fasciae latae compensation and decrease in gluteus medius activation
Hip Abduction of Flexed Hip (Clam Shell Position)	4/5	4+/5	Increase in pain on left; moderate gluteus medius activation

obtained on the second visit. External observation of pelvic floor motor control demonstrated present voluntary contraction, partial voluntary relaxation, absent and reversed involuntary contraction, and absent involuntary relaxation with verbal cues to bear down “like passing gas or a bowel movement.” The patient demonstrated perineal descent at rest with no movement of the perineum with verbal cues to bear down. The patient did not demonstrate a pelvic organ prolapse. These findings demonstrate the dyssynergic activation of the pelvic floor muscles. The patient has a decreased ability to relax the pelvic floor muscles with conscious effort and unable to bear down to simulate having a bowel movement. Lastly, the patient bears down on the pelvic floor when asked to cough, demonstrating poor motor control of the pelvic floor. Typical presentation is strong pelvic floor muscle activation with coughing for involuntary activation.¹⁹

Internal palpation of the pelvic floor muscles caused referring pain and variations of current symptoms. The patient demonstrated taut hip adductors bilaterally with mild discomfort at the origin that was not described as the same as her referring pain. Palpation to the superficial pelvic floor muscles caused mild pain to palpation at left bulbocavernosus muscle only. Patient denied pain at the perineal body with good mobility. Patient reports mild pain to palpation of levator ani muscles on the left with increase in tissue density throughout the left side. She denies pain with palpation to the right side. Internal palpation of the obturator internus on the left was reported as the onset of her referring pain. Quality of tissue was increased in density without trigger points noted. Reproduction of pain with palpation to muscle tissues contributes to pelvic asymmetry and myofascial pain despite lack of trigger points.^{11,19,27,28}

Manual muscle testing of the levator ani muscles was scored as 5/5 on the right and 4-/5 on the left. The patient had a decreased ability to relax levator ani muscles without verbal cues and reported referring pain with muscle contraction. The patient was able to maintain levator ani activation for 10 seconds and complete 5 repetitions without changes in symptoms. The patient was not able to complete any quick contractions in a 10-second time frame due to an inability to relax levator ani muscles between repetitions. The patient reported an increase in referring pain after completing quick contractions. The patient completed levator ani activation overflow with breath holding and over activation of the transverse abdominus and

rectus abdominus with delayed relaxation of the levator ani. Involuntary activation of pelvic floor muscles with coughing caused mild activation with minimal squeeze noted (fair contraction). The patient was asked to bear down with internal assessment and demonstrated strong activation of pelvic floor muscles with squeeze and minimal lift noted.^{16,28,29} The internal assessment of the pelvic floor muscle strength confirmed the over activity of pelvic floor muscle activation with an inability to relax to full resting position during the PERFECT scoring criteria. Isolated pelvic floor muscle activation also was able to reproduce referring pain with quick activation and an inability to relax. The quality of motion also displayed compensations that is common with patients that have chronic pelvic pain.^{16,28-30}

EVALUATION/DIAGNOSIS

Examination findings are consistent with the diagnosis of pelvic floor dysfunction with overactive pelvic floor and piriformis syndrome. The patient reports reproduction of referring pain with palpation to obturator internus more so than levator ani. The patient demonstrates dyssynergic movement patterns of the pelvic floor with an inability to relax after activation of levator ani, overflow of excessive transverse abdominus and rectus abdominus muscles, strong activation of pelvic floor muscles with cues to bear down, and a decrease in activation of pelvic floor muscles with involuntary activation during coughing. The patient is also positive for piriformis syndrome cluster of (+) resisted clam shell, (+) FAIR test, and (+) palpation to piriformis.^{8,15} Addressing the patient's impairments is expected to improve muscle imbalances and allow the patient to return to previous exercise protocol of running and swimming.

Internal derangement of the hip was ruled out secondary to negative special tests of hip derangement such as Scour, FABER, FADDIR, and impingement testing.^{4,25,26} Low back pain with radiating pain was ruled out secondary to a negative screen of the lumbar spine and no reproduction with repeated movement. The therapist also completed a neurological screen with insignificant results.^{5,18,20,31} The SIJ dysfunction was also ruled out secondary to a negative sacroiliac dysfunction cluster.²¹⁻²⁴

PLAN OF CARE

Plan of care was established based on the patient's severity and irritability of symptoms. The patient was recommended

to begin sessions twice a week for 4 weeks and then decrease sessions to once a week as tolerated. Decrease in tissue density of levator ani, obturator internus, and piriformis muscles with appropriate relaxation of pelvic floor muscles were required prior to initiating strength training.¹¹ After the patient could properly relax the pelvic floor and obturator internus muscles, strength training of the pelvic floor muscles was required to restore muscular imbalance and correct dyssynergic patterns with activation and relaxation. Lastly, strengthening of surrounding hip and abdominal muscles to improve core stabilization and proximal hip strength that is required for higher-level activities, such as running and swimming.

INTERVENTION

Intervention details for this case are described in Table 2. Neuromuscular re-education for proper pelvic floor activation with “Reverse Kegels” to bear down pelvic floor minimally to return to a proper resting position. “Reverse Kegel’s” were performed in hooklying with internal cues of single digit and verbal cues to “squeeze and lift” for activation of 1 second. Short duration hold was intended to allow proper muscle activation without increasing over activity. Patient was educated to immediately push down and out (bear down) 25% to 50% of availability.^{10,11} The patient was given exercises to perform 3 times per day in hooklying and self-visual or tactile cues for carryover. The patient reported that NPRS decreased from a 3/10 to 1/10 with subjective reports of “decreased stress” by the end of session to signify immediate positive results. The patient was able to progress “Reverse Kegel’s” from the hooklying position only to supported sitting and supported standing and increase compliance throughout the day by the third visit.

The consecutive sessions focused on internal and external release of muscles through soft tissue mobilization and myofascial release to the piriformis muscle, obturator internus, levator ani muscles, superficial pelvic floor muscles, especially bulbocavernosus.³² Specific techniques included trigger point release of the obturator internus, contract-relax, long duration hold, and cross friction massage to the muscle bellies. Myofascial release was consistently reassessed to determine changes in tissue density and reproduction of pain. Various techniques were used based off the patient's tolerance to manual pressure and amount of release noted in the session.^{33,34} The patient verbalized after each myofascial release technique

Table 2. Interventions per Visit over the Episode of Care

Treatment	Visit #1	Visit #2	Visit #3	Visit #4	Visit #5	Visit #6	Visit #7	Visit #8	Visit #9	Visit #10
Reverse Kegel		1x10	X	X; external cue of tennis ball at coccygeus	X	X	X	X	X	X
Happy Baby Stretch				2x30 s	HEP		Patient demo'd			
Adductor Stretch				2x30 s	HEP		Patient demo'd			
Piriformis Stretch				3x30 s	HEP		3x30 s			
Self Coccygeus Stretch				3 min	HEP	X				
Diaphragmatic Breathing/ADIM				2 min 2x10; 5 s	X	X	X	X	X	X
STM Levator Ani/Superficial PFM				8 min	5 min LA 5 min superficial PFM					
STM Obturator Internus				8 min	10 min					
STM Piriformis				6 min		10 min				
Clam Shell/SL Hip Abduction					3x30 B SL hip abduction	Removed from HEP	3x30 B clam shells	1x30	2x30 clam shells in moderate side plank	
Sahrmann Abdominal					2x10 B; lvl 0.25/5		2x15 B; lvl 1/5	1x15 lvl 1/5	1x15 lvl 1/5 2x15 lvl 2/5	
Plank					Deferred due to poor mechanic		3x15 s mod frontal plank	Patient demo'd	Patient demo'd low plank Patient demo'd moderate side plank	
Bridging					Patient demo'd	HEP				
STM B psoas						10 min				
STM B iliacus						10 min				
KT tape							50% stretch; L TFL inhibit; L gluteus medius facilitate			
Lifting Mechanics									Squat: 1x10 Golfer's: 1x5 B Lunge: 1x5 B	Patient demo'd
Squats										3x10 0#
Split Squats										2x10 B
CKC Hip Abduction										2x15 B hip Hike: dodge ball for resistance

Abbreviations: HEP, home exercise program; ADIM, abdominal draw-in maneuver; STM, soft tissue mobilization; LA, levator ani; PFM, pelvic floor muscles; ER, external rotation; TFL, tensor fasciae latae; LE, lower extremity; L, left; R, right; CKC, closed kinetic chain

that her anxiety levels decreased and it felt “as if she took anti-anxiety medications.” This increased the likelihood that symptoms were directly linked to stress and anxiety levels. According to the current literature, this effect on the muscle bellies is common with the pelvic floor due to the potential to trigger memories and trauma associated with touch.^{35,36} Manual therapy was followed by stretching the following muscles: piriformis muscle, adductors, and hip external and internal rotators. The patient was also educated to complete self-release of coccygeus and piriformis muscles in a sitting position with a tennis ball for external pressure. The therapist progressed the patient’s “Reverse Kegel’s” from supported sitting/standing to all positions as tolerated. The therapist reviewed proper body mechanics with the patient during functional activities such as lifting/carrying. The patient also completed her home exercise program from a previous bout of physical therapy to strengthen deep lateral rotators of the hip, proper abdominal draw-in maneuver (ADIM), and gluteus maximus/medius. Low planks and side planks were removed from her home exercise program at this time due to the inability to activate transverse abdominus without compensations of rectus abdominus and an increase in diastasis recti, or the space of the linea alba. The patient was regressed from sidelying hip abduction to hip external rotation with a flexed hip (clam shells) to decrease compensations at the tensor fascia lata and improve gluteus medius strength. The patient completed 1 to 5 repetitions of “Reverse Kegel’s” between sets of exercise to prevent an increase in activation of the pelvic floor muscles with an increase of core stabilization and proximal hip strength. The patient reported a consistent decrease in pain to 0-1/10 on NPRS by the end of each session.

After 8 visits, the patient demonstrated significant improvement in symptoms with short-term relief but would return to 80% of baseline symptoms after 24 to 48 hours. The patient specifically stated that “Reverse Kegel’s” caused pain and stress levels to decrease significantly. Functionally, she was able to walk on a treadmill for 45 minutes at 3.8 mph. She stated that posterior-lateral hip pain increased after prolonged walking but was abolished with stretching and relaxation. Her pain is rated 1/10 on NPRS at rest and elevated to 2/10 on NPRS with prolonged activities. The patient was progressing objectively with restoration of external pelvic floor motor control and improved perineal descent

at rest. Manual muscle testing of the levator ani muscles was scored as 5/5 on the right and 4+5 on the left. The patient was able to complete relaxation of the pelvic floor muscles but required bearing down slightly to return to resting position. The patient continued to demonstrate (+) piriformis cluster with pain during resisted hip external rotation with hip flexed, localized tenderness to the piriformis muscles, and no reproduction of pain with FAIR test. The patient also demonstrated an increase in tissue density at obturator internus and levator ani with self-reported elevated stress levels at that time. The therapist recommended the patient pursue psychological resources to address stress management and coping strategies. The patient deferred formal treatment but would increase self-management techniques of meditation and yoga.

The patient progressed cardiovascular training to walking at increased speeds and returned to cycling without an increase in pain. The patient began to incorporate “Reverse Kegel’s” with stressful moments to prevent increase in pain. Her home exercise program was progressed to include standard orthopedic strengthening exercises for core stabilization and return to previous exercise protocol.

OUTCOME

After 11 visits, the patient reported 90% improvement of symptoms. The patient stated that overall anxiety and stress levels decreased with decreased severity of symptoms. Specifically, the patient reported NPRS at baseline 0-1/10 with highest elevated pain levels to 1/10 with increased stress and fatigue. The patient was able to return to her gym protocol with an increase in walking briskly on an incline at 4.0 mph and 5.0% to 7.0% incline for 60 minutes. The patient had not attempted running at this time due to fear avoidance of return of pain. Unfortunately, the patient’s deductible had reset at the beginning of the year and the patient could not financially afford to continue with physical therapy at that time. Due to the limit of physical therapy sessions secondary to financial reasons, the discharge session was limited to an external strength evaluation only. No internal assessment was performed to determine pelvic floor strength and endurance during this last session.

Manual muscle testing was performed for external hip musculature and abdominals, Table 3 indicates specific strength results. Abdominal muscle testing was scored via Sahrman lower abdominal strength test-

ing as 1/5 with a neutral spine.⁹ The patient was able to progress abdominal strength to 2/5 but had consistent clicking in the left hip that caused discomfort. The patient’s diastasis recti decreased to two finger widths at the umbilicus and 1.5 finger widths at 3 cm above and below the umbilicus.

DISCUSSION

This case demonstrates the importance of understanding the anatomy of the pelvic floor and how physical therapists should consider the interplay of this anatomy with all orthopaedic diagnoses. The pelvic floor is an essential component of the abdominal cavity that provides stability and control with lower quarter activities. The patient reported that onset of pain began after the birth of her daughter, yet no health care provider assessed the pelvic floor subjectively or referred the patient to an obstetrician or gynecologist. The patient underwent 4 months of standard orthopaedic physical therapy without complete satisfactory results prior to referral back to physician. The patient reported common signs and symptoms of pelvic floor and abdominal weakness with a large diastasis recti, urinary urgency, and minimal stress incontinence. These symptoms are common after childbirth but are typically a symptom of an underlying pelvic floor dysfunction. The patient was completing standard core stabilization and pelvic floor activation that was inappropriate for an over active pelvic floor. The patient was contributing to her symptoms with consistent activation of pelvic floor muscles as part of standard practice after childbirth. Without addressing the underlying cause of impairments with over activity of pelvic floor muscles, the patient would not have progressed with significant reduction of pain and return to previous strengthening exercise protocol. Therefore, it is important for all physical therapists to understand the anatomy and physiology of the pelvic floor and how it can contribute to common orthopaedic impairments. An increase in education to the field would have allowed proper referral to a pelvic health physical therapist more efficiently and improved the patient’s symptoms without unnecessary interventions and referrals to various practitioners.

Table 3. Manual Muscle Testing at Discharge

Muscle	Left	Right	Comments
Hip Flexion	5/5	5/5	No pain
Hip External Rotation	4+/5	5/5	Mild pain in the left buttock
Hip Internal Rotation	5/5	5/5	No pain
Hip Extension	4+/5	4+/5	Mild lumbar extension noted
Hip Abduction	4+/5	4+/5	Good gluteus medius activation
Hip Abduction of Flexed Hip (clam shell position)	5/5	5/5	No pain

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Congratulations to our CSM Award Winners

The Awards Ceremony was held on January 25, 2019, at the Marriott Marquis in Washington, DC.

PARIS DISTINGUISHED SERVICE AWARD

The Paris Distinguished Service Award is the highest honor awarded by the Academy of Orthopaedic Physical Therapy and is given to acknowledge and honor an Academy member whose contributions to the Academy 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 the APTA Combined Sections Meeting.



Gerard Brennan, PT, PhD, is experienced in the management of patients from the aspect of care delivery and measurement of treatment effectiveness, effectively integrating standardization of care in physical therapy and consistent tracking of patient-centered outcomes.

For the past 22 years, Brennan has been in practice at Intermountain, working closely with primary care physicians, orthopedic surgeons and spine specialist physicians in the management of surgical and nonsurgical patients. Brennan holds a PhD in Exercise Science & Sport from the University of Utah-Salt Lake City, MS in Physical Therapy from Duke University, and BA in Biology from Providence College.

As a senior research scientist and Research Director for Rehabilitation Services, Brennan develops and supervises ongoing efforts in physical therapy to measure and track patient self-report measures on approximately 24,000 patients per year using an intranet application encompassing 30 sites in Utah. He has implemented a national network of PT practices using a cloud-hosted, web-based analytic outcomes tracking system, Intermountain ROMS. In addition, he has led a "pay for quality" program with Select Health, Utah's largest payer. He has published 38 manuscripts and led randomized trials, plus quality-improvement, observational and practice-based studies. He was funded by AHRQ in a multi-centered randomized trial to examine the treatment effect and cost-effectiveness of exercise and manual therapy in patients with knee pain due to osteoarthritis. Currently, he is the site principal investigator of two

large pragmatic trials: the TARGET Trial with patients having acute low back pain in primary care, and the Optimize Trial with patients having chronic low back pain. Both trials are funded by PCORI.

A 43-year member of APTA, Brennan has served as Vice President of the Academy of Orthopaedic Physical Therapy and as Vice President of the Research Section. For the Academy of Orthopaedic Physical Therapy, he has chaired the National Outcomes Tracking Development Task Force and for the APTA served on the National Outcomes Tracking Development Task Force for Development of a National Outcomes Data Registry. He has been honored 3 times with the Rose Excellence in Research Award (2007, 2017, and 2019) and was recognized as the Utah Chapter's Physical Therapist of the Year in 2003. The APTA has honored him as a Catherine Worthingham Fellow (2017) for his dedication to improving care and systematic tracking of outcomes.

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



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.



research but may deal with basic science, applied science, or clinical research.

Allyn Bove, PT, DPT, is currently an Assistant Professor at the University of Pittsburgh Department of Physical Therapy. Her teaching duties include teaching Anatomy for the Doctor of Physical Therapy students, assisting with delivery of the musculoskeletal curriculum, and coordinating Pitt student and faculty efforts at a local free health care clinic serving the uninsured population. Ally's research interests are centered on physical therapy health services research, including race and gender disparities in total joint replacement and cost-effectiveness of physical therapy for orthopaedic populations.

Ally received dual bachelor's degrees from Duquesne University in Pittsburgh, PA and her Doctor of Physical Therapy degree from Columbia University in New York City. After working full-time in orthopaedic private practice, she began pursuing a PhD in Rehabilitation Science at the University of Pittsburgh under the excellent mentorship of Dr. Kelley Fitzgerald. She joined Pitt's faculty in 2015 and intends to (finally) defend her dissertation later this year. In addition to her faculty role, Ally practices physical therapy in outpatient orthopaedic and home health settings.

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.



Paul Mintken, PT, DPT, OCS, FAAOMPT, is a Professor in the Physical Therapy Program at the University of Colorado School of Medicine. He completed his fellowship training in orthopedic manual therapy at Regis University. He is a board-certified Orthopedic Clinical Specialist and a Fellow in the American Academy of Orthopaedic and Manual Physical Therapists. He maintains an active research agenda investigating conservative care for musculoskeletal disorders as well as spinal and extremity manipulation. He has received research grants from the APTA and AAOMPT. He has multiple publications in 15 different peer-reviewed journals and has co-authored 3 eBooks and 7 book chapters. His awards include the Dorothy Baethke-Eleanor J. Carlin Award for Excellence in Academic Teaching, the Rose Excellence in Research Award, the JOSPT Excellence in Research Award, the Chattanooga Research Award, and the Outstanding Physical Therapist Award for the State of Colorado. Dr. Mintken is also a lead clinician at Wardenburg Health Center at the University of Colorado, Boulder.

Stephen Hunter, DPT, is passionate about delivering the best quality care at the lowest possible cost and has dedicated most of his career to reducing unwarranted variation of care and measuring the outcome. He is a respected director, mentor, and researcher, but Stephen is a clinician at heart and has continued to treat patients on a weekly basis for almost 35 years at Intermountain Healthcare. He received his Bachelor of Arts in physical therapy from University of Utah in 1984, and his clinical doctorate in 2008. He became board-certified in orthopedic physical therapy in 1996 (renewed in 2006 and 2016).

As the director of Internal Process Control for Intermountain's rehabilitation services, he leads a team of coordinators and researchers dedicated to improving rehabilitation care across the continuum. He has been involved in clinical and quality improvement research since 1986. He was on the principle team that developed and implemented ROMS (Rehabilitation Outcomes Management System) and several Intermountain Care Process Models. He currently serves as the President of the National Association of Rehabilitation Providers and Agencies (NARA), is a member of the APTA Scientific Advisory Panel for the Physical Therapy Outcomes Registry, is a member of the Steering Committee for the APTA Health System Com-

munity, and Co-chairs the APTA TKA Care Process Guideline workgroup. Stephen is a co-investigator for 2 ongoing PCORI funded trials, TARGET and OPTIMIZE. He speaks nationally and has authored or co-authored several articles and abstracts establishing the value of physical therapy. In addition, Stephen travels to Africa a few times each year to help in the provision of wheelchairs for the disabled people of Uganda and Rwanda. He is profoundly honored to receive the Richard W. Bowling – Richard E. Erhard Orthopaedic Clinical Practice Award.

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.



Nicholas Gulla is a 3rd year physical therapy student from Thomas Jefferson University in Philadelphia, PA. He plans to continue his education after graduation by pursuing an Orthopaedic Residency in order to hone his clinical skills, as well as expose himself to further research and teaching avenues. He completed his undergraduate studies at Elizabethtown College where he excelled both in the classroom and on the baseball field as a 4-year NCAA student-athlete. During his time in physical therapy school, Nick has held many leadership positions. He was an integral Co-Founder and is the current Vice President of Jefferson's AAOMPT Student Special-interest Group. He also splits his time between Jefferson's Pro Bono clinics as the Operations Manager in addition to being a Clinic Director. His

research commitments include co-authoring an SLR regarding *The Impact of Therapeutic Exercise on Pain and Function in Persons with Knee Osteoarthritis Involving Specifically the Patellofemoral, Medial Tibiofemoral, or Lateral Tibiofemoral Compartments* as well as a Case Study examining *Post-Concussion Syndrome Management with Multi-Modal Sensorimotor Treatment*, both are still in progress to be published. Outside of the classroom, Nick has spent his time as a baseball instructor and working at the University gym. He enjoys spending his free time running, competing in intramural basketball and volleyball, and playing his guitar. Nick ultimately wishes to pursue further injury prevention and community wellness throughout his professional career as an Orthopaedic Physical Therapist.

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.



Logan Simpkins of Somerset Community College has been named the recipient of the APTA Academy of Orthopaedic Physical Therapy's Outstanding PTA Student Award for 2019. Simpkins holds Bachelor of Science Degrees in Biology and Business Administration from the University of the Cumberlands. He serves as vice-president of his class and the Physical Therapy Student Organization and is a peer mentor and tutor. He is an active member of the Kentucky Physical Therapy Association (KPTA) and was named to the 2018 KPTA All-Academic Team. He

was also the 2018 recipient of the James H. Anderson Award, presented annually to one SCC student who is expected to make a significant contribution to the profession throughout their career.

Simpkins has been active in a number of charitable and community service activities, including volunteering for causes such as the Special Olympics and March of Dimes. He has also coordinated and participated in activities to support the funding of research for the Foundation for Physical Therapy Research through the Marquette Challenge, with Somerset Community College, named the "Outstanding PTA Program" nationally in 2018.

Simpkins was nominated for the award by Ernest D. Brewer, the Director of Physical Therapy at Highlands Physical Therapy. The nomination was supported by program faculty members Steve Hammons and Ron Meade and by program students Brittany Combs and Jeremy Darnell.

Simpkins is the son of Randy and Jennifer Simpkins of River, Kentucky. He is expected to graduate from the Physical Therapist Assistant Program in May 2019, with plans to work in eastern Kentucky.

OUTSTANDING RESEARCH POSTER AWARD

The Outstanding Research Poster was awarded to **Daniel W. Safford, PT, DPT**, for his research project, Reliability, Validity, and Responsiveness of the Timed Functional Arm and Shoulder Test (TFAST) in Patients with Shoulder Problems.



JOURNAL OF ORTHOPAEDIC & SPORTS PHYSICAL THERAPY® AWARDS

The following annual awards, presented for 15 years by the *Journal of Orthopaedic & Sports Physical Therapy*®, recognize the most outstanding manuscripts published in *JOSPT*® within the last calendar year. The George J. Davies – James A. Gould Excellence in Clinical Inquiry Award recognizes the best article published in *JOSPT*® during a calendar year among the categories of clinical research reports (ie, that carry a “Level of Evidence” at the end of the abstract), clinical commentaries, case reports, and resident’s case problems. The *JOSPT*® Excellence in Research Award recognizes the best article published in *JOSPT*® during a calendar year within the category of non-clinical research reports or brief reports (ie, that do not carry a “Level of Evidence” at the end of the abstract), and Clinical Commentaries on research topics. An Award Committee consisting of 4 section representatives (2 from the Academy of Orthopaedic Physical Therapy and 2 from the Academy of Sports Physical Therapy) and the Interim Editor-in-Chief of *JOSPT*® selected the following recipients.

The Journal of Orthopaedic & Sports Physical Therapy’s

2018 George J. Davies – James A. Gould Excellence in Clinical Inquiry Award

Awarded to Joseph R. Kardouni, PT, PhD; Tracie L. Shing, MPH; Craig J. McKinnon, MPH; Dennis E. Scofield, MAEd; Susan P. Proctor, DSc for Kardouni JR, Shing TL, McKinnon CJ, Scofield DE, Proctor SP. Risk for Lower Extremity Injury After Concussion: A Matched Cohort Study in Soldiers. *Journal of Orthopaedic & Sports Physical Therapy*. Volume 48, Number 7, Pages 533-540. doi:10.2519/jospt.2018.8053. July 2018.

2018 *JOSPT* Excellence in Research Award

Awarded to Kathryn J. Schneider, PT, PhD; Willem H. Meeuwisse, MD, PhD; Luz Palacios-Derflinger, PhD; Carolyn A. Emery, PT, PhD, for Schneider KJ, Meeuwisse WH, Palacios-Derflinger L, Emery CA. Changes in Measures of Cervical Spine Function, Vestibulo-ocular Reflex, Dynamic Balance, and Divided Attention Following Sport-Related Concussion in Elite Youth Ice Hockey Players. *Journal of Orthopaedic & Sports Physical Therapy*. Volume 48, Number 12, Pages 974-981. doi:10.2519/jospt.2018.8258. December 2018.

Outgoing Officers and Committee Chairs

We would like to thank our Outgoing Officers, Committee Chairs, and SIG Presidents for their years of service to the Academy of Orthopaedic Physical Therapy:

President, Stephen McDavitt, PT, DPT, MS, FAAOMPT, FAPTA

Director, Duane Scott Davis, PT, MS, EdD, OCS

OPTP Editor, Christopher Hughes, PT, PhD, OCS, CSCS

Public Relations Chair, Jared Burch, PT Occupational Health SIG President,

Lorena Pettet Payne, PT, MPA, OCS

Animal Rehabilitation SIG President, Kirk Peck, PT, PhD, CSCS, CCRT

Congratulations to Our Newly Certified and Re-certified Orthopaedic Certified Specialists

At CSM in Washington, DC, 1,475 physical therapists were awarded their OCS and 430 were re-certified. For a complete listing of the 2018 Certified Clinical Specialists by specialty area, please visit: http://www.abpts.org/uploadedFiles/ABPTSorg/About_ABPTS/Statistics/CertifiedSpecialistsbyArea.pdf

ACADEMY OF

**ORTHOPAEDIC
PHYSICAL THERAPY**



2020 Annual Orthopaedic Meeting

April 3 – 4, 2020

Hilton Minneapolis/St. Paul Airport Mall of America Hotel
Bloomington (Minneapolis), Minnesota



Head, Neck, Thorax, and Spine Disorders: Integration over Isolation

Orthopaedic physical therapists are often presented the challenging task of treating complicated and often coexisting injuries of the head, cervicothoracic spine, and shoulder complex. The Academy of Orthopaedic Physical Therapy's 2020 Annual Orthopaedic Meeting will explore integrated evaluation and treatment principles for these regions highlighting the orthopaedic and vestibular factors affecting patients with concussion injuries, the interconnection of the head neck complex, and the relationship between the neck and shoulder in rehabilitation. A diverse team of experts will integrate best available evidence in hot topic areas and enhance participant learning with exciting laboratory breakouts focused on skill acquisition.

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

Orthopedic Joint Mobilization and Manipulation: An Evidence-Based Approach, Human Kinetics, 2019, \$95
ISBN: 9781492544951, 260 pages, Hard Cover

Author: Manske, Robert C., PT, DPT, MEd, SCS, ATC, CSCS; Lehecka, B. J., DPT; Reiman, Michael P., PT, DPT, MEd, OCS, SCS, ATC, FAAOMPT, CSCS; Loudon, Janice K., PT, PhD, SCS, ATC, CSCS

Description: This book details various joint mobilization/manipulation techniques from the TMJ down to the toes. One of the most unique and valuable features is that anatomical artwork is overlaid on the patient to demonstrate anatomical landmarks and joint position. The accompanying website includes a video library and interactive case studies, which are both well done and easy to navigate. Two ancillaries available to instructors include an instructor's guide and chapter quizzes. **Purpose:** The authors' purpose is to educate physical therapy and osteopathic medical students about joint mobilization and manipulation skills. Their aim is to provide a resource that presents the current evidence behind the application of the techniques, relevant clinical tips to assist practitioners, and clear demonstrations of the selected techniques. The writing is concise and the material in both the print book and on the website make learning these techniques in a lab setting much easier. **Audience:** The intended audience is physical therapists, osteopathic doctors, educators, and students of physical therapy and osteopathic programs who will be treating patients with musculoskeletal pain and dysfunction. The authors are well-known physical therapists who actively teach in doctoral, residency, or manual therapy fellowship programs. **Features:** Joint mobilization and manipulation are the focus of this book. It is well written, with a proper mix of illustrations and written instructions to guide students or novice practitioners. Osteokinematics and relevant anatomy are presented at the beginning of each chapter in a concise but thorough manner. At the end of each chapter is a table displaying the evidence behind the use of manual therapy for the specific body area. The pictures are well done and the addition of the anatomical overlays on the patient greatly adds to the value of the book. The first chapter explains some of the proposed mechanisms of how manual therapy works as well as indications and contraindications. This could have been stressed again for any of the thrust techniques. The book includes many more techniques than the website does. The book's appendix contains a significant number of self treatment techniques, but only three are demonstrated on the website. **Assessment:** This book is of high quality in terms of how the material is presented, in both its conciseness and clarity. The authors did not attempt to make it an anatomical or biomechanical book, but present the material in a manner that supports the focus of the book. The anatomical overlay is brilliant and would be very helpful for learning these techniques, especially for visual learners. The techniques are shown on the videos clearly from patient set up to the end of the technique. The technique is described verbally and in the caption text. I appreciate the way a

technique is done once, and then broken down into its components. The inclusion of the evidence behind incorporating the manual therapy is done well for readers to view quickly. The one omission I found was stressing the reassessment of the patient after the application of a technique. Overall, this book is a welcome addition that will assist educators in teaching future practitioners to develop their manual skills.

*Jeff B. Yaver, PT
Kaiser Permanente*

The Comprehensive Manual of Therapeutic Exercises: Orthopedic and General Conditions, Slack Incorporated, 2018, \$69.95
ISBN: 9781630911645, 577 pages, Spiral Cover

Author: Bryan, Elizabeth, PT, DPT, OCS

Description: True to its title, this is a comprehensive book on therapeutic exercise prescription for use with orthopedic and general patient populations. It presents the basics of exercise physiology, selection, progression, and special populations. It then covers each region of the body, with specific sections on vestibular, pelvic floor, balance, etc. **Purpose:** This purpose is to provide a resource for use by healthcare professionals in rehabilitative and training settings. The author also aims to provide evidence-based support for many of the therapeutic exercise interventions that practitioners have been using for years, with little regard for their origin or usefulness. She also wished to compile information from multiple websites, articles, and books into one useful reference guide. These are extremely worthy objectives and the book is needed to give students, instructors, clinical instructors, and practitioners a valuable resource for their students and patients. **Audience:** The audience is both students and practicing clinicians across a variety of disciplines: physical therapy, occupational therapy, athletic training, and personal training. The book is a valuable resource for all of the above, but will be most valuable for student and newly-practicing physical therapists. **Features:** The book starts with an overview of the basic principles of therapeutic exercise selection, prescription, and progression, citing the research well. Following the basics, the chapters are divided into regions of the body and cover range of motion, stretching, strengthening, and special topics for each region. These chapters end with sample postoperative protocols and treatment ideas. Lastly, chapters are devoted to special populations, including vestibular, pelvic floor, balance and fall prevention, yoga/tai chi, and athletic populations. These last sections are the ones I would like to see expanded upon to include deconditioned/cardio rehab clients, with more on prenatal and postpartum care. **Assessment:** This is a significant improvement over similar books that have come before (i.e. *Therapeutic Exercise: Foundations and Techniques*, 7th edition, Kisner and Colby (F. A. Davis, 2018)). It definitely overcomes the shortcomings of these books and makes the material more impairment-based, while remaining user friendly for students, instructors, and practitioners. The evidence-based elements are complete, yet succinct. As an instructor in an interventions class

for entry-level DPT students, I will be making a change and adopting this book as a recommended resource for my students.

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

Pilates for Rehabilitation: Recover from Injury and Optimize Function, Human Kinetics, 2019, \$49.95
ISBN: 9781492556497, 277 pages, Soft Cover

Author: Wood, Samantha, MPT, MBA, PMA-CPT, RYT

Description: This book explains the principles and evidence for Pilates and provides excellent descriptions and photographs for select exercises. Exercises for the mat and with Pilates equipment are included. The book uses the BASI (Body Arts and Science International) approach to Pilates. **Purpose:** The purpose is to improve the understanding of Pilates and discuss how rehabilitation professionals can apply Pilates exercises, with recommendations for orthopedic injuries. Pilates can be used to improve fitness, posture, performance, and for cross-training. The book addresses the purpose well. **Audience:** The audience is professionals in rehabilitation and orthopedic settings. Students, professors, fitness instructors, and clinicians interested in exercise and Pilates may benefit from this book. The author is a physical therapist with certification as a BASI Pilates instructor and teacher who integrates Pilates into physical therapy treatments at her PT clinic. **Features:** This book covers the history, philosophy, and basic premise of Pilates and summarizes pertinent scientific studies. Exercise instructions include objectives, targeted muscles, variations to address individual needs, progressions, tips for optimal performance, and indications, precautions, and contraindications. Series of photographs show important steps for the exercises. Mat, Reformer, Cadillac, and Wunda Chair exercises are covered in four separate chapters. Labeled pictures show the equipment and their parts. The final section presents chapters based on body regions including cervical and thoracic spine, lumbar spine, shoulder, hip, knee, and foot/ankle. In each chapter, several pathologies or common musculoskeletal injuries are correlated with recommended Pilates exercises. **Assessment:** This well-written book is comprehensive but concise, and is easy to read and understand. The descriptions, variations, and photographs of exercises are excellent. The author covers exercises that can be done with or without specific Pilates equipment. This is a great rehabilitation resource for clinicians and instructors.

*Karin J Edwards, MSPT
Providence Health & Services*

Pediatric Therapy: An Interprofessional Framework for Practice, Slack Incorporated, 2018, \$74.95
ISBN: 9781630911775, 198 pages, Spiral Cover

Editor: Thompson, Catherine Rush, PT, PhD, MS; Coffelt, Ketti Johnson, OTD, MS, OTR/L; Hart, Pamela, PhD, CCC-SLP

Description: This book describes the benefits of interprofessional collaboration among physical therapy, occupational therapy, and speech-language pathology practitioners caring for children. Each of the nine sections includes activities such as case studies designed to encourage discussion. **Purpose:** The purpose is to educate students and clinicians from various disciplines about how to increase collabora-

tive interprofessional practice, with the ultimate goal of improving the quality of care. These objectives are worthy as practice models continue to evolve across pediatric settings and interprofessional collaboration becomes more common. The book meets the objectives, presenting contributions by authors in the fields of physical therapy, occupational therapy, and speech-language pathology and addressing a variety of settings where pediatric therapists work collaboratively, such as in early intervention, schools, and hospitals. **Audience:** The intended audience includes students and clinicians. Although the book would be an excellent addition to educational programs, it is not as suitable for practicing professionals. The primary author has over 40 years of pediatric experience in a wide variety of settings. Most of the associate authors and contributors have doctorate degrees and work in clinical specialties. **Features:** The book begins by describing the theory underlying interprofessional practice, delineating pediatric team members and their qualifications, and discussing cultural competency in pediatric practice. It then delves into the specific practice locations where interprofessional practice is common, with sections encompassing early intervention, schools, high-risk infants, and children with acute and chronic conditions. Six appendixes cover developmental reflex testing, tests and measures, and seating evaluations, assistive technology, professional websites, and useful video and book resources. A shortcoming may be the lack of discussion regarding the home therapy environment. **Assessment:** This book is clearly and concisely written, and uses charts well to highlight important information. It is the only book on this topic that I am aware of that is written by and for pediatric therapists. Others are geared toward medical professionals (such as *Collaboration Across the Disciplines in Healthcare*, Freshman et al [Jones & Bartlett, 2010]), but this book will be of greater interest to the community of pediatric therapists.

*Tara A Parsons, PT, DPT
Coordinated Movements, Inc*

Cardiovascular and Pulmonary Physical Therapy: An Evidence-Based Approach, 3rd Edition, McGraw-Hill Education, 2018, \$95
ISBN: 9781259837951, 815 pages, Hard Cover

Author: DeTurk, William E., PT, PhD; Cahalin, Lawrence P., PhD, PT, CCS

Description: This book addresses the paradigm shift in the education and practice of cardiopulmonary physical therapy in the current environment. It integrates the APTA's Guide to Physical Therapist Practice by also addressing the ICF Disablement Model. It offers evidence-based tests, interventions, and outcome measures, with case studies used by physical therapists in the care of their cardiovascular and pulmonary patients/clients. The previous edition was published in 2011. **Purpose:** The purpose is to provide an evidence-based and physiological basis for physical therapy interventions spanning a multitude of conditions and comorbidities. **Audience:** This is an excellent textbook as well a reference manual not only for physical therapist clinicians engaged in treating patients in acute and intensive care environments, but also for students and sports physical therapy professionals. **Features:** The first of the book's six parts provides a thorough background and history of cardiopulmonary rehabilitation as well as application of the principles from the *Guide to Physical Therapist Practice* in the care and management of patients with cardiopulmonary conditions and comorbidities, and the application of preferred practice patterns in compliance with the ICF and the disablement thresh-

olds. Part II covers the basic medical science, detailing the anatomy and physiology of the cardiopulmonary system, pathophysiology, and pharmaceuticals used to manage various cardiopulmonary conditions. Part III offers an in-depth examination and assessment of the pulmonary and cardiovascular evaluation and assessment, correlating the symptoms to underlying rationales to assess specific disorders. This section also offers detailed information on the risk factors leading to certain pulmonary and cardiovascular conditions. Part IV discusses evidence-based cardiovascular and pulmonary conditions as comorbidities to various musculoskeletal, integumentary, and neurological impairments. The book dedicates a chapter to the cardiovascular concerns in patients with neurological deficits including, but not limited to, stroke, quadriplegia, and paraplegia with detailed effects on the impairment, disability, and quality of life by employing calculated exercise programs. Each of the eight chapters in part V is dedicated to a specific impairment. First, the authors address prevention, risk reduction, and deconditioning. Other chapters cover physical therapy assessments and interventions in patients with obesity, airway dysfunction, cardiovascular pump dysfunction and failure, respiratory failure, as well as neonates. This part also addresses working with and understanding the ICU equipment and failures. Part VI summarizes rehabilitation strategies and the future of cardiovascular health based on global demographics. **Assessment:** The practice of cardiovascular pulmonary physical therapy was standard in hospitals in the U.K. for many years. The strength of this book is in offering evidence-based approaches while integrating the Guide to Physical Therapist Practice with international classifications.

*Rita B Shapiro, PT, MA, DPT
Naval Health Clinic Annapolis*

Training in Neurorehabilitation: Medical Training Therapy, Sports and Exercises, Thieme Medical Publishers, Inc., 2018, \$69.99
ISBN: 9783132415850, 125 pages, Soft Cover

Author: Lamprecht, Sabine; Lamprecht, Hans

Description: The book discusses the historical background of exercise and the physiological and neurological benefits of exercise training, and describes machines and equipment that could be used in the clinic to help challenge neurological patients. **Purpose:** The authors state that "we have written this book in the hope of encouraging therapists to accompany their neurologic patients in the gym and have them participate in structured training programs developed according to the principles of therapeutic exercises." The book serves to reiterate the efficacy of exercise for treating neurological patients. This concept is very relevant in the rehabilitation world, and this book has accomplished its objective. **Audience:** This book seems appropriate for new graduates; for experienced clinicians, a lot of the information is review. The authors have more than 30 years of experience in practice and teaching physical therapy, run a successful physical therapy practice in Kirchheim, Germany, and provide advanced training courses for physical therapists. **Features:** The book discusses the history of therapeutic exercise, the effects of exercise training, and the equipment (with pictures) that can be helpful in handling these challenging patients. Different diagnoses such as stroke, multiple sclerosis, Parkinson's disease, and neuromuscular disorders are covered, as are typical impairments and how to treat them through exercise. A section on neurorehabilitative tests and measures explains the dynamic gait index, Barthel index, and FIM scores, etc., and includes suggestions

for further reading. The pictures, tables, and graphs throughout the book supplement the information well. The main shortcoming of this book is that it appears to be geared more for newer clinicians, although I did learn some new information about dealing with this population. **Assessment:** This book covers in one place therapeutic exercise (history, exercise physiology), neurological rehabilitation, pathophysiology, and assessment tests and measures. Most experienced clinicians would already have most of the contents of this book in their libraries, but in different books; the value of this one is that it brings the information all together.

*Christopher D. Blessing, MS, MPT, OCS, CSCS
University Medical Center of Princeton at Plainsboro*

Neuroscience for Rehabilitation, McGraw-Hill Education, 2018, \$79
ISBN: 9780071828888, 313 pages, Soft Cover

Author: Mosconi, Tony M., PhD; Graham, Victoria A., PT, DPT, OCS, NCS

Description: This book discusses neuroanatomy and neurophysiology with a special emphasis on implications for rehabilitation. Each chapter starts with a case, which is then discussed at the end of each chapter. There are review questions after each chapter. **Purpose:** The authors' purpose is to create a "readable and stimulating" book covering neuroanatomy and neurophysiology which provides the basic science for rehabilitation. Their hope is to "assist students to gain a deeper understanding of the mechanisms of function, injury, and recovery that their patients will undergo." The book meets its purpose, providing an in-depth review of neuroanatomy and neurophysiology along with corresponding real rehabilitation cases to apply this knowledge. **Audience:** The intended audience is students, and this is a good neuroscience book for this audience. The authors have experience teaching neuroanatomy and physiology as well as a clinical background in physical therapy. **Features:** The book begins with chapters on structural and functional anatomy progressing to development and then a "bottom up" look at the nervous system starting with the spinal cord and ending with the cerebral cortex. The cranial nerves are covered well in their chapter and the appendix includes testing, along with nice pictures. Illustrations throughout the book are well done. Cases are presented at the beginning of each chapter and then discussed at the end of each chapter. Other than these cases in each chapter, links to clinical implications and applications are less obvious throughout each chapter. **Assessment:** This is a good book for students in therapy programs. It provides thorough information about neuroscience appropriate for students conditioned to read scientific textbooks.

*Monique Serpas, PT, DPT, OCS
Southeast Louisiana Veterans Health Care System*

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For members who could not attend the Academy of Orthopedic Physical Therapy Member meeting, below is a summary of the financial status of the Academy.

The audited results for fiscal year 2017 show income at \$2,121,527 and expenses at \$1,923,516, leaving the Academy with a profit of \$198,014 (Figure 1). In 2018 the BOD approved taking funds out of the Academy Reserve to pay off the line of credit for the new HVAC unit at the Academy office. This has allowed the Academy to continue operations with no debt obligations. Figure 2 shows the investment amounts as of December 31, 2018. The Academy continues to manage total assets and has been able to increase these assets through efficient operations and investment strategy (Figure 3).

The strong financial state of the Academy continues to support initiatives in research, practice, education, and advocacy.

INCOME/EXPENSE
(Audited)

FINANCIAL YEAR	INCOME	EXPENSE	PROFIT
2015	\$1,591,351	\$1,721,881	\$(130,530)
2016	\$2,144,025	\$1,829,259	\$314,766
2017	\$2,121,527	\$1,923,513	\$198,014

Figure 1. 2016 audited results.

SECTION'S RESERVE FUND
(as of 12/31/2018)

• Reserve Fund:	\$1,277,484
• Research, Practice, Education Fund:	\$2,772,546
• Building Fund:	\$ 363,497

Figure 2. Investment funds.

ORTHOPAEDIC SECTION – TOTAL ASSETS
Audited by Gillette & Associates

	Total Assets	% Gain
2015	5,363,159	-2.3%
2016	5,677,925	5.8%
2017	5,792,575	2.0%

Figure 3. Total assets.

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<https://www.surveymonkey.com/r/CPGQuiz3>



CPG Fun Quiz: Knee Pain and Mobility Impairments: Meniscal and Articular Cartilage Lesions Revision – 2018
<https://www.surveymonkey.com/r/CPGQuiz2>



Pain - Plantar Fasciitis Revision CPG Fun Quiz
<https://www.surveymonkey.com/r/CPGQuiz4>

Have an idea or suggestion for something that can be created to help you better understand or increase the use of the Clinical Practice Guidelines in practice? Please email CPG Coordinator: Brenda Johnson @ Bjohnson@orthopt.org.



HAND PAIN AND SENSORY DEFICITS: CARPAL TUNNEL SYNDROME

Look for the clinical practice guideline (CPG) for Hand Pain and Sensory Deficits: Carpal Tunnel Syndrome in the May issue of *JOSPT*! A huge thank you to all the reviewers, authors, and editors for your comments and feedback. This CPG is a collaborative effort with The Academy of Hand and Upper Extremity Physical Therapy.

Keep an eye out for these CPG Drafts out for review soon: **Patellofemoral Pain Syndrome** and **Physical Therapy Management of Older Adults with Hip Fracture**.

*thank
you*



CPG QUIZZES

Think you know all that you need to know about treating Heel Pain, Knee Ligament Sprains, Meniscal Cartilage Lesions and Achilles Tendinopathy? Take these fun and educational quizzes based on the CPGs, that test your knowledge and help you learn the CPGs! Be sure to share with your health care friends and colleagues.

- Achilles Pain, Stiffness, and Muscle Power Deficits: Midportion Achilles Tendinopathy – 2018 <https://www.surveymonkey.com/r/CPGQuiz1>
- Knee Pain and Mobility Impairments: Meniscal and Articular Cartilage Lesions Revision – 2018 <https://www.surveymonkey.com/r/CPGQuiz2>
- Knee Stability and Movement Coordination Impairments: Knee Ligament Sprain Revision – 2017 <https://www.surveymonkey.com/r/CPGQuiz3>
- Heel Pain - Plantar Fasciitis Revision <https://www.surveymonkey.com/r/CPGQuiz4>

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- *TRUST (Transparency and Rigor Using Standards of Trustworthiness)* Scorecards: Ratings of how well guidelines fulfill the IOM Standards for Trustworthiness.

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PRESIDENT'S MESSAGE

Rick Wickstrom, PT, DPT, CPE

This is an exciting time to begin my service as the new OHSIG President. I am excited about the many OHSIG accomplishments over the past 6 years under the enthusiastic and inclusive leadership style of our Past President, Lorena Pettet Payne. We have a dynamic group of OHSIG members engaged in a number of ongoing initiatives that include:

- revising our Work Rehabilitation Clinical Practice Guideline,
- increasing awareness of occupational health policy makers and stakeholders such as OSHA to remove access barriers to safe and cost-effective physical therapy and fitness services, and
- providing education and mentoring to OHSIG members in concentration areas such as injury prevention/wellness, disability/work rehabilitation programs, and on-site services at the workplace.

The APTA goal of direct access with payment under workers' compensation remains an area that needs engagement at the grass roots level from members of all state chapters. The opioid crisis is a perfect storm to justify greater access to physical therapy professionals at the front line to deliver safe, alternative services to reduce workplace injuries and improve worker fitness for duty. I would like to invite feedback, suggestions, and active engagement from OHSIG members as we proceed to update our strategic plan. This document may be accessed by clicking on the OHSIG Strategic Plan link at our OHSIG web page: <https://www.orthopt.org/content/special-interest-groups/occupational-health>. We want to move forward with initiatives that improve our opportunities to deliver cost-effective occupational health services.

In this issue of *Orthopaedic Physical Therapy Practice*, the OHSIG is pleased to introduce an update to a current concepts article that was adopted in 2011 and originally titled, Occupational Health Physical Therapy: Physical Therapist Management of the Acutely Injured Worker Guidelines. The emphasis of this article was to provide practical advice to assist physical therapists with the management of work participation barriers after an acute injury to reduce productivity loss and psychosocial concerns during recovery. The article that follows may be accessed along with other current concepts documents on our OHSIG web page. My compliments to Trisha Perry, Anthony Cheung, Adrienne Asumbrado, and Katie McBee for this major accomplishment!

Current Concepts in Occupational Health: Managing an Acute Injury that Limits Work Participation

Trisha Perry, PT, DPT; Anthony Cheung, PT, DPT; Adrienne Asumbrado, PT, DPT; Katie McBee, PT, DPT

INTRODUCTION

The purpose of this document is to address physical therapist management for a worker who presents with a neuromusculoskeletal injury incurred on the job, resulting in impairments, activity limitations, and participation restrictions in normal work duties. Related physical therapist interventions and modifications of work methods to prevent workplace recurrence of injury are also addressed. The concepts described for managing acute injuries that result from home or leisure activities would be similar to work-related injuries when work participation is limited, except that non-occupational injuries that are unrelated to employment would not be subject to Occupational Safety and Health Administration (OSHA) requirements.¹

The physical therapist has unique qualifications to facilitate optimal functional outcomes through diagnosis of neuromusculoskeletal conditions and application of interventions to specific body functions and structures affected by the injury. Early physical therapy intervention during the management of the acutely injured worker reduces subsequent use of health care services and downstream costs of care.²⁻⁴ Effective and timely management of the acutely injured worker is enhanced by participation in some form of productive duty, access to workplace-based return-to-work interventions and proactive company approaches, and convenient health care provider services and/or programs.⁵⁻⁷

Inherent in the management of an acute injury that results in work restrictions is frequent and open communication and coordination between the physical therapist and injured worker, other members of the employee health team, and employer representatives as indicated. Clear, concise, functionally relevant information about the injured worker's physical therapist management and recovery progress must be documented and conveyed in a timely manner to necessary stakeholders. Stakeholders may include the injured worker, employer representatives from human resources, safety management, the worker's supervisor and/or a department contact person, occupational health nurse, case manager, adjuster, a physician and/or surgeon, other care providers and the physical therapist.

The following describes a model for managing an acutely injured worker. Concepts discussed are intended to be used in conjunction with the most current versions of the American Physical Therapy Association's Standards of Practice for Physical Therapy,⁸ the Academy of Orthopaedic Physical Therapy's Current Concepts of Orthopaedic Physical Therapy,⁹ Clinical Practice Guidelines,¹⁰ International Classification of Functioning, Disability and Health,¹¹ and nationally recognized occupational health treatment guidelines.

CURRENT CONCEPTS FOR MANAGING AN ACUTE INJURY

1. Reduce local inflammatory response for neuromusculoskeletal pain

Injured worker management during the acute phase is focused on the control and reduction of localized inflammatory response, joint and soft tissue swelling or restriction, and the stabilization and containment of the injury or illness. Immediate, post-trauma intervention lowers the risk of subsequent medical service usage.¹²

Early intervention prevents the negative effects of physical inactivity, disability, depression, and reduces longer-term opioid use and lower-intensity opioid use for musculoskeletal pain.^{3,4,12-15} The role of the physical therapist includes examination and evaluation of an individual for work-related risk factors, impairments, activity limitations, participation restrictions, or other health-related conditions that prevent workers from performing their work duties. An emphasis on instructing the worker in self-management techniques to alleviate symptoms should also be introduced.

2. Validate physical job demands or accommodation options to reduce lost-time

The physical therapist needs to have knowledge of the worker's physical demands for critical work tasks and modified duty options obtained through a job site analysis, video analysis, written physical job demands analysis, or through communication with the employer and/or worker. Early contact between the health care provider and employer to validate physical job demands or accommodation options is an effective workplace intervention to reduce lost-time.⁶

3. Screen for red flags and refer for follow-up when worker is not appropriate for therapy

During the examination and evaluation process, the physical therapist should screen for any red flags and assess the appropriateness for participation in physical therapy. The physical therapist has been equipped with the knowledge and evaluation skills to make appropriate medical referral if the worker is not able to safely participate in physical therapy.¹⁶⁻¹⁸ Communication during this phase typically consists of the worker's status during the initial evaluation noting any impairments, activity limitations, participation restrictions, and whether physical therapy is recommended, or further referral is required.

4. Progress therapeutic management to emphasize daily functional work tasks

Once a diagnosis, prognosis, and plan of care is established, intervention is geared toward improving the worker's ability to move, reducing pain, restoring function, and preventing disability. Therapeutic exercise and functional activity training are the cornerstones of physical therapist management of the injured worker. The emphasis should be on progressive work and therapeutic activities to increase muscle performance, improve joint integrity and mobility, and improve function for the injured worker. Functional training should include instruction in pacing and body mechanics to improve tolerance for work tasks. Activities and treatment interventions should transition to more vigorous therapeutic activities to prepare the worker for return to usual work and lifestyle activities.

5. Implement evidenced-based interventions into clinical practice

Whenever possible, interventions should be based on evidence supporting its use in order to return injured workers to their jobs safely and in a timely manner. Clinicians are expected to integrate clinical experience with conscientious, explicit, and judicious use of research evidence in order to make clearly informed decisions to help maximize and optimize patient well-being.¹⁹ Clinical practice guidelines and current concepts of orthopaedic physical therapy have been developed by the AOPT based on best available evidence; which provide a good starting point for evaluation, examination, and treatment for commonly encountered clinical scenarios.^{9,10}

6. Identify and address modifiable psychosocial risk factors that may prolong recovery

Since psychosocial risk factors are predictive of future disability with work-related injuries, screening for psychosocial risk factors and integrating behavioral and cognitive modification techniques targeted to address modifiable psychosocial risk factors can reduce future disability.²⁰⁻²² Assessment tools used to help screen for any psychosocial risk factors include the Fear-Avoidance Beliefs Questionnaire (FABQ),²³⁻²⁵ the Fear-Avoidance Components Scale (FACS), the STarT Back,²⁶ the Örebro Musculoskeletal Pain Screening Questionnaire,²⁷ and the Optimal Screening for Prediction of Referral and Outcome (OSPRO).²⁸ Early identification of workers at risk of developing chronic conditions and associated work-related disability is important for appropriate modification of a worker's plan of care and education.²⁴ Psychosocial issues may be as important as physical management in preventing chronicity and understanding disability.²⁹ Interventions in the acute stage addressing these issues may be most useful in reducing fear-avoidance beliefs and promoting return to normal activity.^{20-22,29} Patient education based on a fear avoidance model consists of educating the injured worker in a way such that the worker views his or her pain as a common condition, rather than as a serious disease that needs careful protection.³⁰ Education in combination with exercise have decreased fear-avoidance beliefs and reduced long-term absences due to illness in individuals with low back pain.³¹

7. Promote modified duty with work restrictions to reduce lost productivity

Modern clinical management for most neuromusculoskeletal conditions supports having the injured worker stay at work, with modifications if needed, or return-to-work as soon as the injured worker is medically appropriate.³²⁻³⁷ Workers with neuromusculoskeletal conditions who return-to-work enjoy better health than those who remain off of work.^{33,37,38} Participating in work tasks is noted to: (1) be therapeutic, (2) help to promote recovery and rehabilitation, (3) lead to better health outcomes, (4) minimize the harmful physical, mental and social effects of long-term sickness absence and worklessness, (5) reduce the chances of chronic disability, long-term incapacity for work and social exclusion, (6) promote full participation in society, independence and human rights, (7) reduce poverty, and (8) improve quality of life and well-being.³⁸

If the worker is unable to safely participate in normal work duties, reduction of the physical demands with transitional work or temporary modified duty with work restrictions can facilitate early return-to-work and promote work retention.^{32,34,38} Reduced work hours, worksite modifications, and adjustments to job

responsibilities are commonly used strategies to provide return-to-work opportunities for workers who can participate in some work duties but have not fully recovered from their injury and are not ready to be fully re-integrated into the workplace.⁵

Physical activity and early return-to-work interventions are not associated with increased risk of recurrent injury if there is compliance with work and activity restrictions.^{32-34,36-42} Modified work programs cut the number of lost work days in half, and injured workers whom are offered modified work duty return-to-work twice as often as those that are not.⁶ Modified work can be introduced in a variety of ways in which each case should be individually assessed and tailored to the injured worker.^{43,44} Transitional work arrangements are a way of facilitating return-to-work and is only meant to be temporary. There is also strong support that a workplace-based return-to-work program can reduce work disability duration and associated costs.^{6,34-36,38} Implementing strategies early in the process with an emphasis on return-to-work, is one of the most effective ways to support positive employment outcomes for workers with impairments.⁷

8. Minimize risks of injury recurrence by facilitating job and work station improvements

During the return-to-work planning, the physical therapist also has a role in minimizing injury recurrence, which may include making sound and practical ergonomic recommendations for work station design, work performance and worker training to improve knowledge of personal responsibilities for fatigue control. Refer to AOPT's Current Concepts in Occupational Health: Work-Related Injury and Illness Prevention for further recommendations along with interventions and parameters related to occupational injury/illness prevention and ergonomic services as provided by physical therapists.⁴⁵

9. Monitor worker response to resumption of normal work tasks and modify as needed

Resumption of normal work tasks for the injured worker is warranted when the functional goals set by the physical therapist have been met or exceeded and the worker has returned to work without any restrictions.⁴² If there is uncertainty on how the injured worker would tolerate a resumption of normal work tasks, the worker may benefit from a trial of full work duty to assess tolerance of normal work activities. The ultimate anticipated goal is the restoration of the injured worker's physical and functional capacity for a safe and expeditious return-to-work. If impairments are still present and causing disability, and the injured worker appears to not be benefiting from physical therapy, the injured worker may then be referred for the need of additional interventions or the appropriateness of an impairment rating.^{16-18,46}

10. Consider referral to another health professional when disability duration exceeds guideline recommendations

If the neuromusculoskeletal problem is not satisfactorily resolved within a limited number of visits per nationally recognized occupational health treatment guidelines, a referral for further examination and evaluation by another health professional may be indicated.^{16,17} Official Disability Guidelines include physical therapy treatment guidelines as a resource that provides an evidence-based starting point for time out of work, serving as an invaluable tool for obtaining the information necessary for effective management of return-to-work following illness/injury and

clinical practice recommendations.⁴⁶

An objective Functional Capacity Evaluation (FCE) should be considered when disability duration is excessive and there is not adequate information to substantiate a worker's readiness and ability for a safe return-to-work.^{47,48} An FCE is a comprehensive performance-based medical assessment consisting of a standardized battery of tests in which an injured worker's functional ability is determined and then compared to the physical job demands.^{49,50} An FCE can be used to indicate physical and functional recovery following an injury and guide return-to-work readiness.⁵⁰⁻⁵² Results from an FCE, along with a review of previous treatment progression, provide input into whether a worker can physically participate in work tasks or whether they may require entry into an appropriate work conditioning or work hardening program.

CONCLUSION

The global outcomes of effective physical therapist management of the acutely injured worker are to optimize work performance and minimize the development of work-related occupational disability. Physical therapists are uniquely skilled to manage the rehabilitation of the acutely injured worker and best positioned to assess return-to-work readiness and the timing of such readiness through a thorough evaluation and examination assessing for any impairments, and activity limitations that may hinder involvement in normal work duties. Managing acute injuries in a cost-effective manner relies heavily on collaboration and communication among all involved stakeholders. Early physical therapy intervention and participation in productive work, whether that consists of normal work duties or modified work, is essential in facilitating optimal functional outcomes, promoting quicker return-to-work duties, managing utilization costs; all while reducing the potential detrimental effects to the neuromusculoskeletal system due to physical inactivity. Proper management must also include the identification and intervention of risk factors that may impact positive outcomes or need further medical referral, while gradually advancing the injured worker toward more functional activities and occupation-specific stresses. Through adherence to evidence-based treatment guidelines and timely early intervention, physical therapists play a pivotal role in the management and prevention of recurrent workplace injuries for the acutely injured worker.

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OCCUPATIONAL HEALTH LEADERSHIP

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President's Letter

Annette Karim, PT, DPT, PhD

Board-certified Orthopaedic Clinical Specialist

Fellow of the American Academy of Orthopaedic Manual

Physical Therapists

Welcome to 2019! In this edition of *OPTP*, I would like to thank and recognize our scholarship contributors at CSM. The following is a recap of what took place at CSM 2019.

We had a 2-day preconference course on Musculoskeletal Sonography of the Lower Limb Focused in Sport & Performing Arts, taught by Megan Poll, Doug White, Marika Molnar, and Scott Epsley (Figure 1). There were 45 attendees, and we co-sponsored the course with the Academy of Orthopaedic Physical Therapy (AOPT) and the AOPT's Imaging SIG.

After the course, we presented Marika Molnar with our first PASIG Lifetime Achievement Award, which included a plaque and an honorarium of \$1000. Thank you, Marika, for your contributions to the PASIG and to the world of dance medicine education and practice! (Figure 2)



Figure 1. Marika Molnar teaching in the preconference course.



Figure 2. Marika Molnar receives the first PASIG Lifetime Achievement Award.

We held a well-attended membership meeting in which we reported our new PASIG mission and vision statements, as described below.

Mission Statement

The mission of the Performing Arts Special Interest Group (PASIG) is to be the leading physical therapy resource to the performing arts community.

Vision Statement

Advancing knowledge and optimizing movement and health of the performing arts community through orthopaedic physical therapist practice through the following guiding principles:

- Identity
- Quality
- Collaboration

We recognized officers Rosie Canizares (re-elected Vice President and Education Chair), Jessica Waters (outgoing Nominating Committee Chair, incoming Membership Chair), Duane Scotti (incoming Nominating Committee member), Mandy Blackmon (re-appointed Dancer Screening Chair), Anna Saunders (re-appointed Student Scholarship Chair), Janice Ying (outgoing ISC Chair, incoming Secretary), Megan Poll (outgoing Secretary), Andrea Lasner (appointed Practice Chair), and Marissa Schaeffer (appointed Outreach Chair). We also recognized the support and work completed by Lori Michener, our AOPT Liaison over the past 2 years. Tara Jo Manal, AOPT Director, is our new Liaison. Tara Jo served the PASIG as Education Chair and Vice President from 2004-2011. Welcome Tara Jo!

We decided to spend our remaining non-rolling funds on a research grant and continued sponsorship of the International Association of Dance Medicine and Science.

Our non-rolling fund expenditures in 2019 to date

\$3,750.00 2019 fund in Jan 2019
 - 1,000.00 (lifetime achievement)
 - 400.00 (student award)
 - 200.00 (certificate plaques)
 - 100.00 (Printing and shipping)
 \$2,050.00 remaining

Our 2018 encumbered fund is \$1,305.40. I will update you with a 2019 report once the pre-conference and post-conference course incomes are tallied at our AOPT offices. We spent all but \$43.93 of our 2018 non-rolling funds. Because we do not roll over any leftover monies, we spent the remaining funds on swag wear to promote our identity. All who attended the membership meeting received a PASIG cup and pen, and we disbursed the "PASIG bling" at the AOPT table in the exhibit hall.

We also awarded a \$400 student scholarship to Alyssa Anderson for her platform presentation on Flexor Hallucis Longus Tendon Morphology in Dancers With and Without Tendinopathy. In addition to presenting during the programmed platforms,

Alyssa gave our members a brief presentation during the membership meeting. (Figure 3)



Figure 3. Rosie Canizares with Alyssa Anderson, PASIG student scholarship recipient.

Kristen Schuyten and *Corey Snyder* presented our main programming Olympian to Novice: Using Evidenced-based Screening for the Performing Artist. Attendance was beyond room capacity, extending into overflow space.

Additional meetings were held at CSM, with good dialogue. Please contact the Chairs if interested in minutes for those meetings and information on how you can be involved. PASIG Fellowship Taskforce Q&A (Laurel Abbruzzese, Fellowship Taskforce Chair), PASIG Outreach Committee (Marissa Schaeffer, Outreach Chair), PASIG Dancer Screening Networking/Q&A (Mandy Blackmon, Dancer Screening Chair).

We had 11 PASIG poster presentations and 3 platform presentations this year. The presentations were packed and full of stimulating conversation. (Figures 4-8)

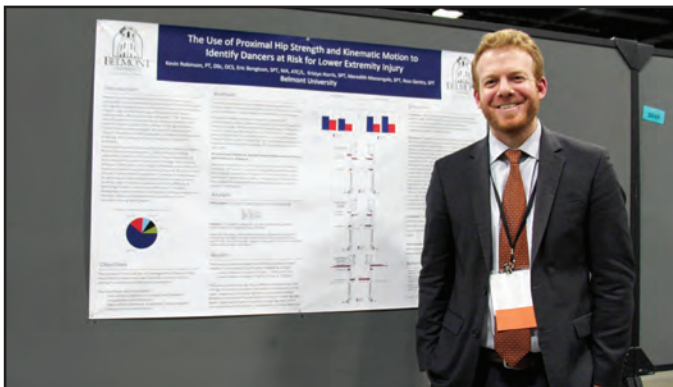


Figure 4.

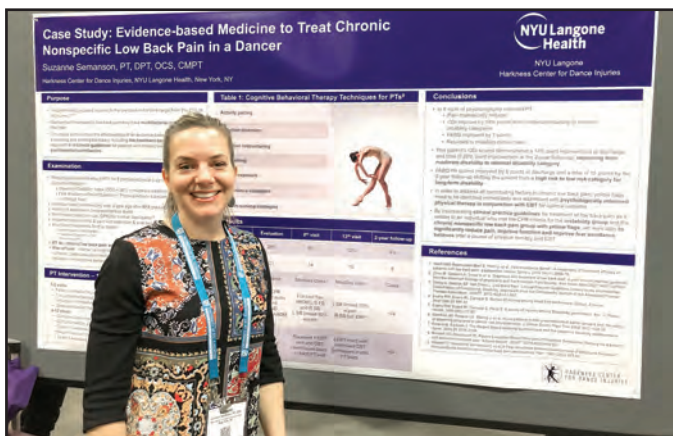


Figure 5.



Figure 6.

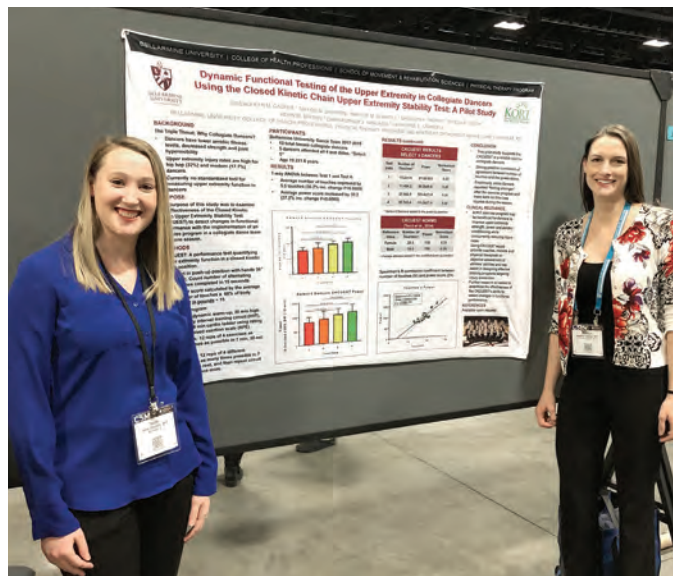


Figure 7.



Figure 8.

We held a two-day post-conference course taught by Tara Jo Manal on Emergency Medical Response at the University of Delaware. The course was attended by 5 PASIG members. I anticipate our members will need this course as our performing arts fellowships grow.

We congratulate the following performing arts fellowship programs:

The Ohio State University Sports Medicine Performing Arts Fellowship

The Johns Hopkins Hospital Performing Arts Fellowship

Harkness Center for Dance Injuries Performing Arts Fellowship

Columbia University Irving Medical Center & West Side Dance Performing Arts Fellowship

If you are interested in developing a performing arts fellowship, the Description of Fellowship Practice is available online:

http://www.abptrfe.org/uploadedFiles/ABPTRFEorg/For_Programs/DFPs/ABPTRFE_PerformingArtsFellowshipDFP.pdf#search=%22Performing%20Arts%22

On behalf of the PASIG leadership (see Figure 9), thank you all for your work to grow our profession! Please take a few minutes to join our PASIG membership, which is free to all AOPT members.

Annette Karim, PASIG President



Figure 9. PASIG leadership. Marissa Hentis, Andrea Lasner, Marissa Schaeffer, Mandy Blackmon, Annette Karim, Laurel Abbruzzese, Rosie Canizares, Dawn Muci, Duane Scotti. Not pictured: Brooke Winder, Sarah Edery-Altas, Anna Saunders, Janice Ying, Tara Jo Manal



PERFORMING ARTS LEADERSHIP

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CSM 2019 UPDATE

FASIG Leadership

Following another great year for the FASIG at the Combined Sections Meeting in Washington, DC, we are continuing initiatives to explore and define what a specialty practice in Foot and Ankle might look like. Further, we continue to seek out collaboration and shared opportunities to advance foot and ankle clinical care. The American Orthopaedic Foot and Ankle Society (AOFAS) will host their annual meeting in Chicago this September with expanded programming focused on rehabilitation for a growing number of associate members. The FASIG also continues to advocate for foot and ankle related research across the AOPT and the APTA at large. In that spirit, we continue to use our Facebook page to disseminate a current “literature update” for research related to foot and ankle topics. We would like to highlight one such article just published in the *Journal of Prosthetic and Orthotics International*.

LITERATURE UPDATE

Chris Neville, PT, PhD

The use and management of foot orthoses is common to many clinical practices that treat patients with foot and ankle complaints. This intervention can be confusing to patients and clinicians alike, with numerous custom and off-the-shelf options available across the market. It is also a controversial intervention with an abundance of literature that can provide conflicting views. One recent study¹ is worth review because it was performed using sound methods and a strong design for addressing many of the biomechanical questions related to orthoses use. It is also particularly interesting because the findings are quite similar to other work in the field and despite providing insight, also raises many questions about how and if orthoses work.

In the study by Balsdon et al, the goal was to compare 3 orthotic devices (hard custom, soft custom, off-the-shelf [OTS]) to a barefoot and shod condition. The study included subjects with a range of foot types (pes planus, pes cavus, and normal arch) and measured medial longitudinal arch movement using a novel markerless fluoroscopic method to compare the biomechanical effects across 5 conditions. All subjects were fitted with custom foot orthoses that were hard or soft in construction and compared to OTS orthoses during the mid-stance point of a single step. The hypotheses in the study were that the hard orthoses would create the largest change in raising the arch while the soft orthoses would be associated with less change, while OTS would have the least change. These conditions were compared to shod and barefoot conditions.

As a partial rejection of the hypothesis, the results indicated that both the hard and soft custom orthoses were associated with similar amounts of raising the arch compared to the shod and barefoot conditions. Interestingly, there was not a difference between the OTS and the control conditions. But, there was also not a significant difference between the OTS and custom orthoses although the effect of the OTS was smaller. This is a rather typical set of findings from studies designed to compare a gradient of effects (hypothesized largest effect with hard orthoses, less

with soft, and least with OTS) using biomechanical measures. The results and effect from the orthoses are largely as expected but given the size of the differences they only reach statistical significance when comparing the largest effect to the control condition. The subtler effect from the OTS orthoses ends up not being different from the control conditions suggesting it is less effective but also not different from the custom orthoses creating some confusion as to the best interpretation. One could correctly state the custom orthoses did not function any better (statistically speaking) than the OTS with regards to arch control. The overall changes measured in this study were around 5° so the ability to find differences between conditions is hard except at the extremes. So, one is left to speculate as to the value of these differences for comparing the two custom orthoses to the OTS as the study limitations (sample size, subject selection, etc) make further studies necessary to address the question.

This study adds to the body of literature that orthoses do have biomechanical effects that might explain the positive clinical effects found in controlled trials completed for a host of clinical pathologies. However, the interpretation of results remains difficult with the small changes in motion typically seen in the foot leaving recommendations for future studies to fill the gaps typically left.

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President's Message

Carolyn McManus, MPT, MA

Once again, CSM offered exciting opportunities for PTs to connect, share ideas and learn about the latest research, education practices and treatment strategies for pain conditions. CSM 2019 educational session programming included a wide range of courses addressing pain-related topics, including the PSIG session, Pain Talks: Conversations with Pain Science Leaders on the Future of the Field. Kathleen Sluka, PT, PhD, Carol Courtney, PT, PhD, Steve George, PT, PhD, Adriaan Louw, PT, PhD, and I shared a lively discussion highlighting the role of physical therapy in pain rehabilitation and how we personally became interested in the field. We exchanged our ideas on the current state of research on pain and its translation into clinical practice. Audience members' questions, submitted via text or email, added to this engaging discussion. The PSIG session was live streamed on the AOPT's Facebook page and remains as a January 25th post if you missed it and would like to view leaders in the field sharing ideas. We have had a tremendous response to the Facebook post with over 11,000 views at the time of this writing! We can all be grateful to PSIG Public Relations Chair Derrick Sueki, PT, PhD for proposing this innovative, informative session and to both Derrick and VP/Education Chair, Mark Shepherd, DPT, OCS for program planning, coordinating and moderating. Mark did a fantastic job as moderator, engaging the audience and keeping the discussion moving to cover multiple topics. Thank you to all involved in making the session a great success!

CSM 2019 also brought changes to the PSIG Board. I want to thank outgoing Nominating Committee Chair Jacob Thorpe, PT, DHS, OCS for his contributions and welcome Rebecca Vogsland, DPT, OCS to the Nominating Committee. In addition, Scott Davis, PT, EdD, OCS is leaving his role as our AOPT Board liaison. Going forward, AOPT President Joe Donnelly, PT, DHS, OCS will serve as our AOPT Board liaison. I want to express my gratitude to Scott for his many years of service and the invaluable guidance he gave me over the past two years. The PSIG Board and I look forward to working with Joe as we continue to execute our strategic plan activities. Please see the website for the complete listing of current PSIG Board members.

I want to thank those members who attended our CSM 2018 membership meeting. The meeting powerpoint is posted on the PSIG website. Our membership increased from 605 to 678 since CSM 2018. At the meeting, accomplishments from the past year were highlighted and Derrick Sueki, PT, PhD discussed our initiative to establish a pain specialty. While at CSM, Derrick met with the Chair of the American Board of Physical Therapy Specialties (ABPTS) representatives. We were assigned an ABPTS liaison and provided with a road map to complete the specialization process. It was suggested that we simultaneously establish a credentialing program for pain residency/fellowship, as it will be cost effective and efficient to do both concurrently. This is an expensive endeavor and will require approximately \$25,000 to get started and move forward. As we will need support from the AOPT Board, Der-

rick presented this initiative and the steps he has taken thus far to the AOPT Board members at the AOPT Board meeting at CSM. AOPT President Steve McDavitt instructed Derrick to proceed by writing a specific proposal outlining the necessary steps and financial needs required to begin the pain specialty and pain residency/fellowship processes. This formal proposal will be presented to the AOPT Board for consideration. Going forward, we will need PSIG members willing to actively participate in a task force for creating a pain specialty and pain residency/fellowship. This task force will be led by Derrick. If you are interested in participating in this initiative, please contact Derrick at dsueki@apu.edu.

PSIG Practice Chair Craig Wassinger PT, PhD and PR Chair Derrick Sueki PT, PhD are on the Pain Education Clinical Practice Guideline team. The group met in Washington prior to CSM 2019 for a writing and organizational retreat. The process is steadily moving forward. The team plans to present components of the CPG at CSM 2020 in Denver. Additional venues for guideline presentations are being considered. Publication of the CPG for Pain Education can be anticipated in 2020. As the AOPT and Academy of Physical Therapy Education are co-sponsors of the CPG, the guidelines will be published in *JOSPT* and potentially the Journal of Physical Therapy Education.

PSIG VP/Education Chair Mark Shepherd, DPT, OCS continues to lead our efforts to establish a quarterly webinar series. Our slate of webinar speakers for 2019 has been chosen and dates are being finalized. Speakers and topics are: Kathleen Sluka, PT, PhD on pain mechanisms, Brett Neilsen, DPT, OCS on educating patients about pain, Megan Pribyl, MPT on pain and nutrition and Katie McBee, DPT, OCS on screening for chronic pain risk. Please check the PSIG website for dates and registration information.

The preconference and educational session proposal submission deadline for CSM 2020 has passed, however, the poster and platform abstract submission deadline is July 20, 2019. Visit www.apta.org/CSM/Submissions for additional information and submission of your abstract for a poster or platform presentation. 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 a proposal.

The PSIG Board is always open to your ideas on how we can improve the PSIG to better meet your needs. We welcome your participation in our activities. If you have suggestions, would like to help with Strategic Plan activities or contribute a clinical pearl or research topic to our monthly emails, please contact us. Be assured we will take your interest and recommendations into our discussions and activities as we move forward to identify and promote best practice, evidence-based pain treatment. I can be reached at carolyn@carolynmcmanus.com.

PHARMACOLOGY

Independent Study Course 28.4

Learning Objectives

1. Understand the pathophysiology of common cardiovascular conditions as relevant to the pharmacological management of those conditions.
2. Identify drug classes used to treat common cardiovascular conditions, including heart failure, angina pectoris, myocardial infarction, arrhythmia, hypertension, and blood clot.
3. Describe the mechanism of action for each drug class used in the treatment of a cardiovascular condition and its relevance to the pathophysiology of the condition.
4. Describe the interaction between pharmacology and physical therapy in the treatment of common cardiovascular conditions.
5. Understand the pathophysiology of diabetes mellitus, including the differences between Type 1 and Type 2.
6. Identify oral and injectable anti-diabetic drug classes used to treat Type 2 diabetes mellitus and their mechanism of actions.
7. Understand the side effects of drugs used to treat Type 2 diabetes mellitus as relevant to physical therapy.
8. Understand the relationship between insulin and exercise.
9. Understand the general principles of pharmacology as they relate to clinical decision-making and outcomes in the physical therapy management of a patient.
10. Identify the important components of pharmacotherapeutic principles as they relate to all populations and their impact on the physical therapy management of a patient.

Topics and Authors

Pharmacological Management for Cardiovascular Conditions

Melissa Bednarek, PT, DPT, PhD, CCS

Pharmacological Management for Diabetes Mellitus

Melissa Bednarek, PT, DPT, PhD, CCS

Principles of Pharmacotherapeutics

(Reissued from ISC 16.1.1)

Suzanne L. Tinsley, PT, PhD

Pharmacology for Pain

(Audio-Aided PowerPoint Presentation)

Suzanne L. Tinsley, PT, PhD

Editorial Staff

Christopher Hughes, PT, PhD, OCS, CSCS—Editor

Gordon Riddle, PT, DPT, ATC, OCS, SCS, CSCS—Associate Editor

Sharon Klinski—Managing Editor

Description

Pharmacology plays a significant role in administering physical therapy to a patient. Clinicians must be aware of not only what medications patients are taking but also the impact these drugs have on the neuromusculoskeletal system. This series covers the most common knowledge needed to effectively understand issues for common cardiovascular conditions, diabetes mellitus, and the management of pain. There are two unique aspects in this series. The first is a re-issue of a popular and previously offered monograph (bonus) that reviews the principles of pharmacotherapeutics. This monograph serves as an introduction for those readers who may not be familiar with pharmacotherapeutics or can serve as a comprehensive review for those who have a previous education on the topic. The second is an audio-based PowerPoint presentation that adds a dynamic element to the coverage of pharmacology and pain management. Dr. Tinsley's oral presentation and excellent slide presentation will engage the listener and allow her to share her enthusiastic conversational style. Case study presentations are included to reinforce the didactic material.

Continuing Education Credit

Fifteen 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.



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CSM SCHOLARSHIP AWARDED

The winner of the 2nd annual Imaging SIG Scholarship to CSM was Ruth Maher for her presentation entitled “Concurrent Validity of Coccygeal Motion Palpation and Transabdominal Ultrasound Imaging in the Assessment of Pelvic Floor Function in Women.”

Do you have a project involving imaging or know of someone planning on presenting at CSM 2020 in Denver? If so, why not apply for the Imaging SIG scholarship once your proposal or that of your colleague is accepted. Go to the Imaging SIG page at orthopt.org and select the item on the left entitled “Imaging SIG Scholarship.” The details will be provided there and additional e-mail and social media notification will be forthcoming.

The scholarship was initiated for CSM 2018 to help promote involvement with imaging research in physical therapist practice. If you have noteworthy work or know of a colleague who has, you or that AOPT member may qualify to receive financial assistance to present in Denver. More information will be forthcoming on the application process and the important dates.

CSM RECAP

Over 40 physical therapists participated in the 2-day pre-conference course at CSM 2019 in Washington, DC, entitled “Musculoskeletal Sonography of the Lower Limb Focused in Sport & Performing Arts” as presented by Megan Poll, Scott Epsley, Doug White and Marika Molnar. Participants divided time between lecture on ultrasonographic patho-anatomy and becoming familiar with viewing the lower limb anatomy of their colleagues using real-time ultrasound. Because of the excellent response, a complementary course on another region may be proposed in a coming CSM.

The educational session during the main conference and sponsored by the Imaging SIG also gained extremely favorable reviews. With a session entitled “Referral for Imaging: Autonomy and Accountability,” speakers Aaron Keil, Scott Rezac, and Daniel Watson conveyed their cumulative experiences of referral and response to imaging results. Connie Kittleson, President of the Wisconsin chapter, related the landscape of imaging referral in that state since referral privileges became specifically allowed. Amma Maurer, MD, a musculoskeletal radiologist, offered her perspective of imaging referral and communicating with physical therapists. All of this was moderated and managed by Jim Elliott.

IMAGING SIG MEMBER GROWTH

Membership in the Imaging SIG is growing rapidly. In mid-year 2017, the Imaging SIG had approximately 270 members. At the time of CSM 2019, we topped over 400 members. That represents an almost 50% increase in Imaging SIG members in only a year and a half. We expect this to continue to rise as the interest in imaging as a part of practice becomes more prominent.

The member meeting at CSM starting at a noteworthy 6:45 a.m. on Friday, January 25th was attended by over 40 devoted members.

BUILDING ALLIANCES AND EDUCATING PRACTITIONERS FOR THE FUTURE

Several states have begun efforts to work toward obtaining imaging referral privileges. As highlighted in our educational session a year ago at CSM in New Orleans, two key steps are very important in the process: building alliances and education. In states that have been successful and those less so, the importance of establishing and building relationships with many in the medical profession, particularly radiologists, has been found to be critical. Similarly, education of members within the jurisdiction as well as assuring PT educational curricula are providing sufficient content to prepare clinicians for future practice is a foundation to this effort moving forward. If you have any influence in your state, please encourage development of these two essential elements.

EVIDENCE OF IMAGING REFERRAL APPROPRIATENESS

If you have not read the published work by Aaron Keil and colleagues in Physical Therapy, please take a few minutes to look the article over and consider its potential impact. Perhaps this is a preview for the future of physical therapist practice. Available on-line in February and scheduled to appear (as of this writing) in the March issue of Physical Therapy journal is “Ordering of Diagnostic Imaging by Physical Therapists: A 5-Year Retrospective Practice Analysis.” A review of cases in which physical therapists with imaging referral privileges in a direct access setting discovered appropriate referral for imaging occurred in 91% of the patient cases as assessed by a radiologist analyzing the patient records. These results are effectively similar to that by Crowell et al (2016) in which they discovered similar levels of imaging referral appropriateness by physical therapists in a direct access setting, including that with advanced imaging.

WISCONSIN WEBINAR

Since the initiation of imaging referral privileges in Wisconsin, those in that state have been collecting data on imaging referral and its impact. An impressive volume of data has been collected and the process is on-going. We tentatively have planned for a webinar, presented through AOPT, for presentation of this Wisconsin information. More information on this will be forthcoming. The timeline for the webinar is tentatively late summer or early fall season.

AIUM WEBINARS

The Imaging SIG and APTA are continuing to cultivate our relationship with the American Institute for Ultrasound in Medicine. Two webinars as presented by physical therapists are scheduled for 2019 and two more are yet to be finalized. E-mail announcements about these will be forthcoming. You can also go to aium.org and look for the Webinar Series in the CME Center for details.

President's Message

Matt Haberl, PT, DPT, OCS, ATC, FAAOMPT

It was great to see those of you who were able to make it to Washington, DC, for our annual Combined Sections Meeting. It was especially great to see and thank **Matt Stark** for his hard work this last year as his term on the Nominating Committee Chair came to an end. We look forward to you handing off the baton to Melissa Dreger and our newly elected Nominating Committee member **Bob Schroedter**. Thank you Matt for all your assistance!

This year was a busy year for the ORFSIG as things kicked off with our "sold out" preconference course followed by our business meeting. The ORFSIG was also involved in several other collaborative meetings with the Academy of Physical Therapy Education Residency and Fellowship Special Interest Group (RFE-SIG), The American Council of Academic Physical Therapy (ACAPT), the American Academy of Orthopaedic Manual Physical Therapy (AAOMPT), and the American Board of Physical Therapy Residency and Fellowship Education (ABPTRFE). It has been very exciting to see the progress every year in the growth of Residency and Fellowship Education!

Continuing that growth forward in 2019 we have been very eager to share with everyone our **new Strategic Plan, Goals, and Objectives**. As with any strategic initiative, it could not occur without the great assistance our members. I want to thank those who shared their time and expertise in making this happen.

Board Liaison:

Aimee Klein

Practice Committee Chair:

Kathy Cieslak

Residency and Fellowship:

Molly Malloy

Academy Office Staff:

Tara Fredrickson

ORFSIG Leadership:

VP/Education Chair:

Kathleen Geist

Nominating Committee:

Chair: Melissa Dreger

Mary Derrick

Bob Schroedter

Facilitator:

Janet Bezner

Members:

Chris Gaines

Chrysta Lloyd

Darren Calley

Megan Frazee

Kirk Bentzen

Kris Porter

Matthew Thomason

Mary Kate McDonnell

Sarah Nonaka

Stephen Kareha

Goals, Objectives, Strategies

1. **GOAL:** The process of residency and fellowship accreditation will be positively impacted through relationship building and advocacy.
 - a. **OBJECTIVE:** Formalize the ORFSIG's liaison role between ABPTRFE and members/directors of residency and fellowship programs to promote communication and excellence in practice.
 - i. Identify a communication method to allow residency and fellowship directors to communicate needs to ORFSIG by the end of 2019.
 - ii. Communicate in writing all Residency and Fellowship matters with the AOPT Board Liaison on a minimum quarterly basis.
 - iii. Serve as the liaison from AOPT to ABPTRFE regarding all orthopaedic residency and fellowship matters on a quarterly basis.
 - iv. Establish a current ORFSIG member as a member of the ABPTRFE Standards Committee by 2020.
 - b. **OBJECTIVE:** Establish relationships with other stakeholders related to residency and fellowship education.
 - i. Communicate with entry-level PT education stakeholders (programs, students, and clinical site/instructors, Clinical Education/ACAPT) to enhance understanding of and access to residency and fellowship education by 2020.
 - ii. Meet with other Academy/Section Residency/Fellowship leadership on a quarterly basis regarding shared initiatives.
 - iii. Establish liaisons with the Academy of Education-RFSIG to collaborate on residency and fellowship research, shared resources, and other residency/fellowship matters by the end of 2019.
 - iv. Identify an ORFSIG Liaison to communicate with AAOMPT leadership and Program Director-SIG regarding OMPT Fellowship accreditation issues and opportunities for networking by the end of 2019.
2. **GOAL:** Excellence in orthopaedic residency and fellowship education will be promoted.
 - a. **OBJECTIVE:** Provide and encourage the use of mentoring resources for all orthopaedic residency and fellowship programs to establish common practice strategies.
 - i. Develop mentorship resource task force by end of 2019.
 - ii. Survey current programs about innovative mentoring strategies and environments by 2020.
 - iii. Review and disseminate current research and existing resources on mentoring best practices by January 2020.
 - iv. Provide educational webinars and resources for the mentorship and development of mentors and faculty by 2021.
 - v. Identify and address gaps in current research regarding effective mentorship practice by January 2022.

Mission:

Serve and support the orthopaedic residency and fellowship community.

Vision:

To be a community of excellence in orthopaedic residency and fellowship education.

- vi. Create and distribute a mentoring resource by 2023.
- b. **OBJECTIVE:** Provide resources to enable programs to perform regular curriculum monitoring and evaluation.
 - i. Develop curriculum task force by the end of 2019.
 - ii. Collect and share resources that programs are using to meet the New Quality Standards requirements for clinical residencies/fellowships by 2020.
 - iii. Identify areas that need to be modified or added to the AOPT's curriculum package to meet the new DRP/DFP and Quality Standards requirements, and communicate these needs to the ISC Editor by Jan 1, 2021.
- c. **OBJECTIVE:** Identify developmental changes in residency and fellowship education that are impacting programs and their participants.
 - i. Disseminate a poll to program directors to query the interest in participating in a standardized offer date for orthopaedic residency programs at CSM 2019.
 - ii. Develop task group to evaluate annual aggregate data regarding the number of residency/fellowship positions, availability and sharing of resources by 2019 year end.
 - iii. Develop a task group to monitor and evaluate ABPTRFE Quality Standards, and the new Policies and Procedures by 2019.
 - iv. Survey current residency/fellowship programs in 2019 regarding changes in ABPTRFE Quality Standards and impact on sustainability.
 - v. Evaluate the new ABPTRFE Policies and Procedures and the impact this will have on program development by 2020.
- d. **OBJECTIVE:** Facilitate the conduct of research in residency and fellowship education.
 - i. Identify a member of the ORFSIG to lead orthopaedic residency and fellowship education research by end of 2019.
 - ii. Create a research work group by 2019 to work with AOPT Research Committee.
 - iii. Develop and distribute a residency and fellowship research agenda by 2020.
 - iv. Request funding from AOPT for funding one research project annually by the end of 2019.
 - v. Solicit members to write and publish at least one resident/fellow case report/case series or research report annually in Orthopaedic Physical Therapy Practice by 2020.
 - vi. Provide annual reference list of clinically relevant journal articles related to residency and fellowship to members via Orthopaedic Physical Therapy Practice.
- 3. **GOAL:** Members of the ORFSIG will be engaged and connected.
 - a. **OBJECTIVE:** Recruit relevant stakeholders to become members of the ORF-SIG.
 - i. Investigate the possibility of adding residency and fellowship roles to the Academy database by 2019 year end.
 - ii. Determine current member make up (Program Directors, Faculty, Mentors, Resident/Fellow Graduates, current or aspiring resident/fellow) by 2019 year end.

- iii. Recruit 100% of program directors & >50% program faculty to be members through annual requests, monitoring of ABPTRFE developing and accredited programs, engagement with other relevant SIGs, promotion at CSM, and Next Conference by 2021 CSM.
- iv. Increase ORFSIG membership by 10% by recruiting aspiring or current residents and fellows through promotional efforts by 2020.
- v. Promote the ORFSIG at least one national conference per year by funding and having a presence at the meeting.
- b. **OBJECTIVE:** ORFSIG membership will be reached and engaged across all program and membership categories.
 - i. 50% of members will read/receive direct emails to members by 2020 (send read/receipt in outlook for tracking).
 - ii. At least 50 members will attend ORFSIG quarterly webinars and CSM in person annual Business Meeting by 2020.
 - iii. Greater than 50% of members will participate in ORFSIG distributed surveys.
 - iv. ORFSIG leadership will recruit members to engage in all liaison positions and work groups to complete required strategic planning by 2020.

Over the next year, we will be working on implementing this Strategic Plan. Make sure to reach out to the SIG to help and get involved!

COMBINED SECTIONS PRECONFERENCE EDUCATIONAL COURSE

Kirk Bentzen, Kathleen Geist, Aimee Klein, Tara Jo Manal, and Eric Robertson filled every seat with their preconference course "Clinical Excellence and Quality Standards in Residency/Fellowship Education." It was a pleasure working with all types of programs from developing programs to those programs who have been here since the beginning. The presenters of the course shared their program forms and policies and answered several questions for the participants. We look forward to hosting similar courses like this in the future.

If you are interested in presenting at CSM 2020, please contact our VP, Kathleen Geist at kgeist@emory.edu.

ABPTRFE NEW SUBSTANTIVE CHANGES POLICIES AND PROCEDURES

In June 2018 the ABPTRFE released their new Policies and Procedures (P&P) connected to the Quality Standards. In November, complimentary documents to the P&P were released including Substantive Changes documents. Following this, AAOMPT PD-SIG members and ORFSIG members identified the significant strain some of the new policies may have on their programs. To fully understand the impact, the new policy 13.4 - Substantive changes would have on programs the ORFSIG in collaboration with the AAOMPT PD-SIG developed a survey to send out to its members.

Given the significant impact this would have on programs, the Academy of Orthopaedic Physical Therapy (AOPT) and AAOMPT Board members and its respective leaders were notified. Further communication with APTA staff and leadership ensued sparking a meeting at APTA headquarters including key stakeholders in April. The AOPT remains committed in supporting excel-

Residency Program Results:

- **57/104 (55%)** Programs responded
- **40/57 (70%)** Are Multi-site programs
- **20/57 (35%)** Were not yet aware of the Policy changes
- **24/57 (42%)** Are unsure or will not keep their accreditation status with ABPTRFE.
- These sites account for:
 - ✓ 67% of Clinical Sites: 356/533
 - ✓ 71% of Annual Resident Graduates: 311/436
- **63% were not in favor of the new policy changes**

Fellowship Program Results

- **26/32 (81%)** ABPTRFE accredited OMPT Fellowship Programs completed survey
- **0/26 (77%)** were not in support of requiring physical site visits for new participant sites
- The opposed programs **offer 250 (90%) of the available training positions** annually

Estimate the need to add a total of 232 participant sites in 2019, costing a total of **approximately \$111,000 in total for physical site visits alone.**

Substantive changes program director survey results.

lence in residency and fellowship education and look to address these concerns, as well as program questions regarding the tracking and reporting of the new Primary Health Conditions, the requirements of a specialty certification prior to a fellowship with the removal of a skills track, and the potential for a two tiered system requirement for fellowship training hours. We look forward to this meeting in addressing these concerns.

Members are encouraged to continue to contact the ORFSIG and members of the ABPTRFE and APTA staff regarding these and any other concerns. At this time, **ABPTRFE has postponed the implementation of policy 13.4 Substantive change until further evaluation.** We will continue to keep you updated as processes change.

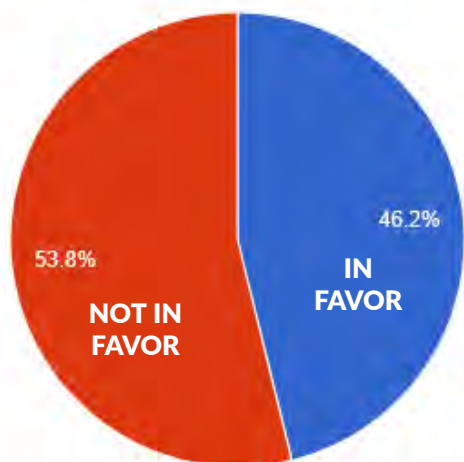
STANDARDIZED OFFER DATE PROGRAM SURVEY

In an effort to identify developmental changes in residency and fellowship education that are impacting programs and their participants, it was brought to our attention that some programs were turning away applicants due to lack of space in their programs while other programs were unable to fill their spots. In response, the ORFSIG surveyed orthopaedic residency and fellowship programs to query the interest in participating in a standardized offer date for orthopaedic residency programs in the Fall of 2018.

Seventy-six (76) program directors responded to the survey along with 1 program coordinator. Of all respondents, **only 46% were interested** in exploring a common application date for orthopaedic residency programs.

Common app date interest

- o Yes (36, 46.2%)
- o No (42, 53.8%)



We found that 79% of the responding programs use RFTCAS. Sixty-four percent of respondents were from residency programs, 14% were from fellowship programs, and 22% ran both residency and fellowship programs. Sixty-seven percent of responding programs use an onsite learning model, 10% a distance learning with onsite labs, and 23% are a hybrid of distance and onsite learning models. It is important to note that sub-analysis found that none of these subgroups demonstrated more than 55% interest in exploring a common application date.

Based upon the feedback gleaned from the sports residency common application date, it is imperative to have a vast majority in favor of a common application date prior to investing further into a similar model. Thus, it is the recommendation of our subcommittee to investigate other methods of applicant pooling unless at least 90% of programs are in favor of a common application date.

ACAPT WHITE PAPER ON TERMINAL INTERNSHIP INTERVIEWS

In 2018, the Clinical Education Special Interest Group released a white paper presented by a partnership of several DPT programs about DPT students in their terminal affiliation requesting time off for residency interviews. The controversial paper outlined challenges and barriers DPT programs encountered with clinical sites and advocated for students to focus on their terminal experiences. Further recommendations were made for residency programs to offer alternative methods of interviewing and selecting their candidates.

Given this new perspective and impact on other stakeholders along the post-professional continuum, ORFSIG members, Kirk Bentzen, Carrie Schwoerer, and Matt Haberl initiated a dialogue with ACAPT regarding the white paper leading to a meeting with Carol Beckel, St. Louis University and Tiffany Enache, University of New Mexico. Discussion included the perspective of residency directors and the need to abide by program and sponsoring organizations' guidelines in relation to hiring practices. Based on the discussion, it was further decided that the white paper needed to be expanded to address issues across the professional development continuum including, but not limited to setting expectations of DPT students while in the professional program, helping DPT students/potential residents identify a single area of residency practice to pursue, and educating Directors of Clinical Education (DCEs) and clinical instructors (CIs) regarding the perspectives of residency programs. We look forward to ongoing collaboration.

RFESIG UPDATE

The ORFSIG continues to collaborate with the RFESIG. Over the past year, the RFESIG has focused on two main initiatives:

- **Assistance in mentoring and curriculum development for current or developing residency/ fellowship programs**
 - ✓ To do this the RFESIG Think Tank work group was established to focus on collecting, reviewing, and organizing resources from established residency/fellowship (RF) programs as an open access resource center for programs. These resources are now available to all APTA members and housed in the “RFESIG’s Think Tank Compendium” on the APTE’s website at the following link: <https://aptaeducation.org/special-interest-group/RFESIG/think-tank-compendium.cfm>.
 - ✓ The Think Tank is an ongoing effort and will continue to review resources submitted. If you would like to share unique or creative resources with other programs, please submit to the Think Tank at the above link.
- **Promoting research on residency and fellowship education - The RFESIG has implemented two strategies for this initiative:**
 - ✓ Highlighting current research on RF education in the RFESIG’s quarterly newsletter.
 - ✓ The creation of a work group to analyze past and current RF education research to determine the needs of future research, develop strategies to increase communication across RF programs about current and upcoming research projects, and increase collaboration in research across residency specialties. The work group has met twice in the past 4 months and will continue to meet throughout the year.

PROGRAM DIRECTOR ADMINISTRATION SURVEY

A work group has been developed to understand current program director administration duties and the time associated with these. We hope to better understand what processes may lead to additional time requirements and how programs directors use their time. Please keep an eye out for the survey if you have not seen this yet.

ABPTRFE COMMUNICATION AND QUALITY STANDARDS

Please make sure to sign up on the APTA HUB to receive ongoing communication from the ABPTRFE. We encourage all programs to contact ABPTRFE in addition to the ORFSIG with any specific questions or concerns. Directions on how to sign in and receive weekly emails regarding posts to the APTA HUB visit our website for directions.

- <https://www.orthopt.org/content/special-interest-groups/residency-fellowship>

OPTP QUARTERLY SUBMISSIONS

The ORFSIG will continue to accept case reports, resident/fellowship research, etc to be highlighted in future issues of *Orthopaedic Physical Therapy Practice*. Take this opportunity to highlight your program and your participants’ work!

Thank you to all our members for their hard work. We look forward to great things in 2019!

Letter From the President

Jenna Encheff, PT, PhD, CMPT, CERP

Meet the President



It is my honor to introduce myself as the recently elected President of the ARSIG, but before I do that, let me thank Kirk Peck for his 6 years of service as President. Under his leadership, our special interest group has made tremendous strides in reaching many goals related to our mission. Most recently, he and Stevan Allen, our current Vice President, have completed a Practice Analysis to assess current practice patterns among licensed physical therapists who are currently treating animals

in the United States. Concurrently a Clinical Practice Standards Document was drafted. These two documents are currently under review by the Academy of Orthopedic Physical Therapy Board with the ultimate goal of these documents leading to development of an official *Description of Practice* for Animal Physical Therapy. Kirk has graciously volunteered to continue to be the driving force in progressing these documents forward along with Stevan, so I thank him for his continued service!

As for me, you may be wondering a little about me and my background—I will keep it as brief as possible! I graduated from the University of Toledo (UT) in 1995 with my Bachelor's in physical therapy and worked at The Medical College of Ohio (now University of Toledo Medical Center) for 9 years in in-patient rehabilitation, primarily with patients with spinal cord injury. After serving as a lab assistant for UT's PT program and then teaching for two years part-time in a PTA program, I decided that teaching was definitely what I wanted to do full time. I earned my Master's in Exercise Science in 2002, and then my PhD in Biomechanics with a minor in Research and Measurement from the University of Toledo in 2008. I taught for 11 years in the DPT program at the University of Findlay in Ohio, and have been full faculty at Trine University in Indiana in the DPT program for the past 4 years. I currently teach Anatomy I/II, Musculoskeletal PT I/II, and Neurorehabilitation I, and have taught our Research series along with a few other courses including Geriatrics and Therapeutic Exercise. Very varied! I completed my manual physical therapist certification (CMPT) through the North American Institute of Orthopaedic Manual Therapy (NAIOMT) and my Equine Rehabilitation Practitioner Certification (CERP) through the University of Tennessee/Northeast Seminars. I have practiced in orthopedics for the past 13 years and see a few patients as needed for manual and dry needling at my brother's OP clinic near Toledo, OH (he's a PT too!). I see horses for rehabilitation/therapeutic exercise (along with the occasional cow or mini donkey!) and I also perform evalu-

ations/hippotherapy as needed for a local hippotherapy/therapeutic riding center. I am a Barefoot/Natural Trimmer on the side, so I also have several equine clients to whom I give "pedicures." I have been riding pretty much my entire life and have three off-track Thoroughbreds (Mishka, 18, Jazz, 15, Keno, 3). I keep in shape by riding, stacking hay, trimming hooves, and shoveling poo! I also have one dog (Jemima) and 6 (yes, 6) cats. Everybody is/was a rescue or stray including the horses who I adopted through New Vocations Racehorse Adoption.

Although training horses, working with horses on exercises for conditioning or certain events/activities, hoof trimming, rider biomechanics, etc. have long been a part of my life, it was not until a couple years ago, that I became "serious" about merging 3 of my passions: physical therapy, horses, and biomechanics of riders. After attaining my CERP, becoming more active in the ARSIG was a natural next step and I welcome the challenge!

For our current members and prospective members, I want to assure you that the intention of our special interest group is to continue to grow the awareness and support of physical therapists practicing in the animal domain. We will stay focused on continuing to be a benefit and resource to our members. I look forward to a productive, successful year and invite each of you to become involved. Meanwhile, the officers of the ARSIG are here to help you. If there is anything we can do for you, please do not hesitate to contact us!

CSM 2019 Washington, DC

Stevan Allen, MA, PT, CCRT

For the fifth consecutive year, our ARSIG had an excellent turn out for our two-hour programming at this year's CSM in Washington, DC. At the publication deadline, we do not have the actual numbers from the APTA, but it was estimated to be well over 400 attendees. We had THREE overflow rooms required to accommodate all the growing interest in animal physical therapy.

This year's presentation, "Manual Therapy for Equine and Canine Clients: Different Species, Same Concepts" was very well received. This session used multiple video demonstrations (over 60) on manual therapy techniques to address soft tissue and joint dysfunctions in equine and canine mammals. A specific focus on joint biomechanics in relation to restoring functional movement was addressed. Our 3 instructors offered a lively presentation to show the general audience how all of their physical therapy skills can be used to advance the care of our 4 legged mammal patients.

Presenters at this year's event were:

- Karen Atlas, MPT, CCRT, founder/owner and Director of Rehabilitation at Atlas Rehabilitation for Canines (ARC) in Santa Barbara, California.
- Sharon Classen, PT, ATC, CERP, from Omaha, Nebraska. Sharon provides physical therapy to Olympic and elite level horses and riders in International Equestrian Federation (FEI) division at major international shows. Sharon is the Owner and Director of Serenity Physical Therapy in Omaha.
- Kirk Peck, PT, PhD, CSCS, CCRT, CERP, from Omaha, Nebraska. Kirk is the past President of the ARSIG and is

currently the Chair of the Department of Physical Therapy at Creighton University in Omaha.

In addition, two of our presenters, Sharon Classen and Kirk Peck, also participated in a panel discussion on "Clinical Practice Guidelines Management Following a Concussive Event." Sharon was part of a panel of 5 physical therapists across a broad range of practice experience from pediatrics, to sports medicine, to show jumpers in equine athletics.

What can YOU do to help support the ARSIG's Mission and Vision?

Mission: To lead and innovate in the art and science of physical therapy in animal rehabilitation.

Vision: Serve as the premier resource for excellence in practice, education, research, and advocacy by physical therapists in animal rehabilitation, fitness, and performance.

Each year there are literally thousands of hours contributed by dedicated individuals who are passionate about animal rehabilitation and progressing the mission and vision of the ARSIG. However, we have many hurdles, tasks, and challenges ahead of us! We need your HELP! Please consider volunteering for a task force. We will have many upcoming opportunities for you to serve YOUR special interest group and we really need your support. Your membership in the Academy of Orthopaedic Physical Therapy and more specifically, the Animal Rehabilitation Special Interest Group is an indication that you are committed to making a positive difference, not only in your own community, but throughout your state and the country.

Keep your eyes on your email in the next several months for blast emails as we put forth calls for volunteers for support! This support can range from submitting an article for OPTP, to serving as a State Liaison for the ARSIG, to aiding in development of resources such as articles or general home exercise plans that our members can access on our website. Whether you are a PT, a PTA, or a PT/PTA student, we can use your talents to support our mission and vision!



Kirk Peck, Sharon Classen, Karen Atlas present at CSM in Washington, DC.



A packed house for the ARSIG programming at CSM.

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— Sunny Rubin, MSPT, CCRT, Seattle, Washington

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ANIMAL REHABILITATION LEADERSHIP

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Newsletter Coordinator:

Lisa Bedenbaugh, PT; lhinerman2@aol.com



THE SHOULDER

Independent Study Course 28.2

Learning Objectives

1. Understand shoulder biomechanics and pathomechanics.
2. Understand the components of a thorough physical examination in the diagnosis of rotator cuff tears.
3. Describe the evidence supporting a framework for prescribing therapeutic exercise for shoulder dysfunction.
4. Understand the specific etiology and pathology involved in rotator cuff tears.
5. Describe the rationale for nonoperative and operative treatment of rotator cuff tears.
6. Describe appropriate rehabilitation interventions in the early, middle, and late stages following rotator cuff repair surgery.
7. Describe the risk factors for development of shoulder stiffness and differential diagnosis.
8. Describe the current evidence for nonsurgical management of shoulder stiffness and specific physical therapy interventions.
9. Understand the natural history for adhesive capsulitis and key concepts in the prevention of postoperative stiffness.
10. Describe principles, goals, and quantitative measures of progression in the nonoperative rehabilitation for shoulder instability.
11. Understand advantages and indications for surgical methods to correct shoulder instability.
12. Identify criteria to return to desired activity following a postoperative rehabilitation program.
13. Discuss the structure and criteria for rehabilitation progression governing return to sport for the overhead athlete.
14. Identify appropriate return to play progression modifications to accommodate for workload variations and seasonal factors.
15. Compose a functional testing algorithm for return to activity based on patient expectations.

Editorial Staff

Christopher Hughes, PT, PhD, OCS, CSCS—Editor
Gordon Riddle, PT, DPT, ATC, OCS, SCS, CSCS—Associate Editor
Sharon Klinski—Managing Editor

Description

This 6-monograph series addresses the biomechanical, pathological, and evaluative aspects of treating the shoulder. Specific emphasis is placed on the rotator cuff, shoulder instability, and special concerns for the overhead athlete. Therapeutic exercise and return to activity considerations are discussed in detail as well. Decision making and treatment plans for nonoperative and operative scenarios are highlighted. All authors have extensive experience in the evaluation and management of shoulder pathology.

For Registration and Fees, visit orthoptlearn.org
Additional Questions—Call toll free 800/444-3982

Topics and Authors

Clinical Kinesiology of the Shoulder Complex: Foundations for Therapeutic Exercise—Phil Page, PhD, PT, ATC, CSCS, FACSMT

Evaluation and Treatment of the Rotator Cuff—Craig Garrison, PT, PhD, ATC, SCS; Joseph Hannon, DPT, PhD, SCS, CSCS; Dean Papaliodis, MD

Evaluation and Treatment of the Stiff Shoulder—Nancy Henderson, PT, DPT, OCS; Ryan Decarreau, PT, DPT, SCS, ATC, CSCS; Haley Worst, PT, DPT, OCS; Jay B. Cook, MD

Management and Treatment of the Anterior Shoulder Instability—Charles A. Thigpen, PT, PhD, ATC; Lane N. Rush, MD; Sarah Babrowicz, BS; Richard J. Hawkins, MD, FRCS(C); Michael J. Kissenberth, MD

Return to Performance: Baseball Athletes and Throwing Programs—Ellen Shanley, PT, PhD, OCS; Thomas J. Noonan, MD; Susan Falsone, PT, MS, SCS, ATC, CSCS, COMT, RYT®

A Functional Testing Algorithm for Returning Patients Back to Activity—George J. Davies, PT, DPT, Med, SCS, ATC, LAT, CSCS, PES, FAPTA; Eric Hegedus, PT, DPT, PhD, OCS; Matthew Provencher, MD; Robert C. Manske, PT, DPT, SCS, ATC, CSCS; Todd S. Ellenbecker, PT, DPT, MS, SCS, OCS, CSCS

Continuing Education Credit

30 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.

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PHYSICAL THERAPY MANAGEMENT OF CONCUSSION

Independent Study Course 28.1



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Additional Questions:
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More Detail Can Be Found At:

<https://www.orthopt.org/content/education/independent-study-courses/browse-available-courses/pt-management-of-concussion>

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APTA
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PHYSICAL THERAPY**



2019

NEXT Conference & Exposition
June 12-15, 2019
Chicago, IL

National Student Conclave
October 31-November 2, 2019
Albuquerque, NM

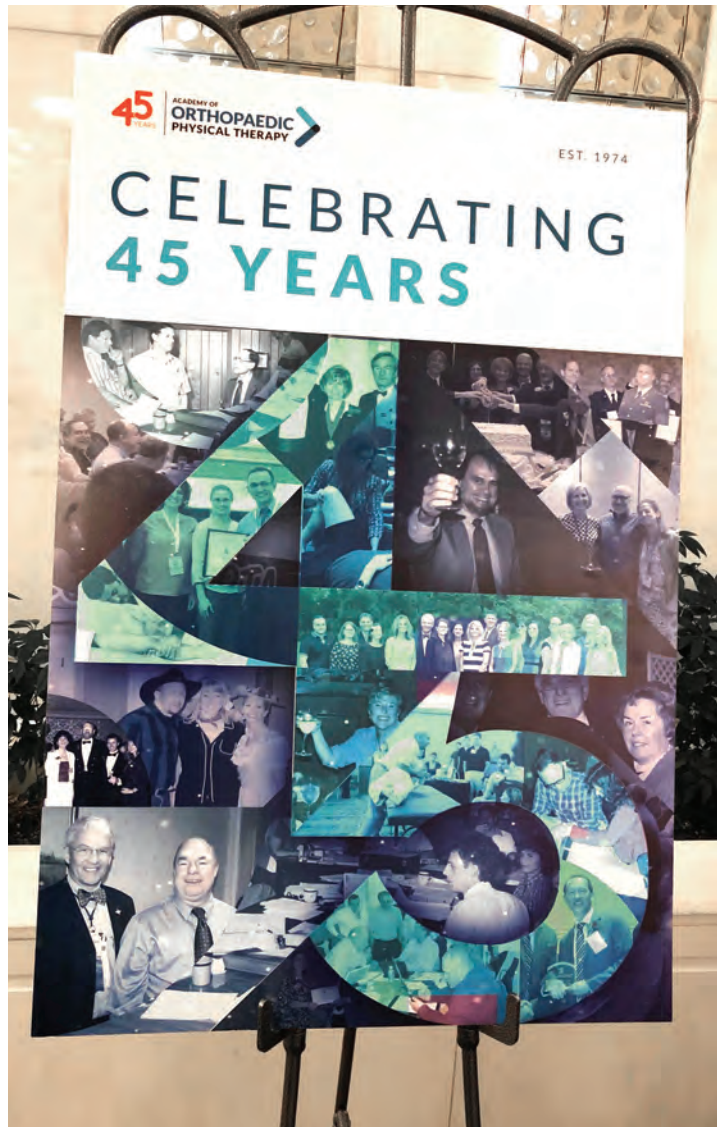
2020

CSM: February 12-15, 2020
Denver, CO

AOM: April 3-4, 2020
Minneapolis, MN

2021

CSM: February 24-27, 2021
Orlando, FL



Orthopaedic Physical Therapy Practice
2920 East Avenue South, Suite 200
La Crosse, WI 54601

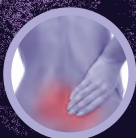
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