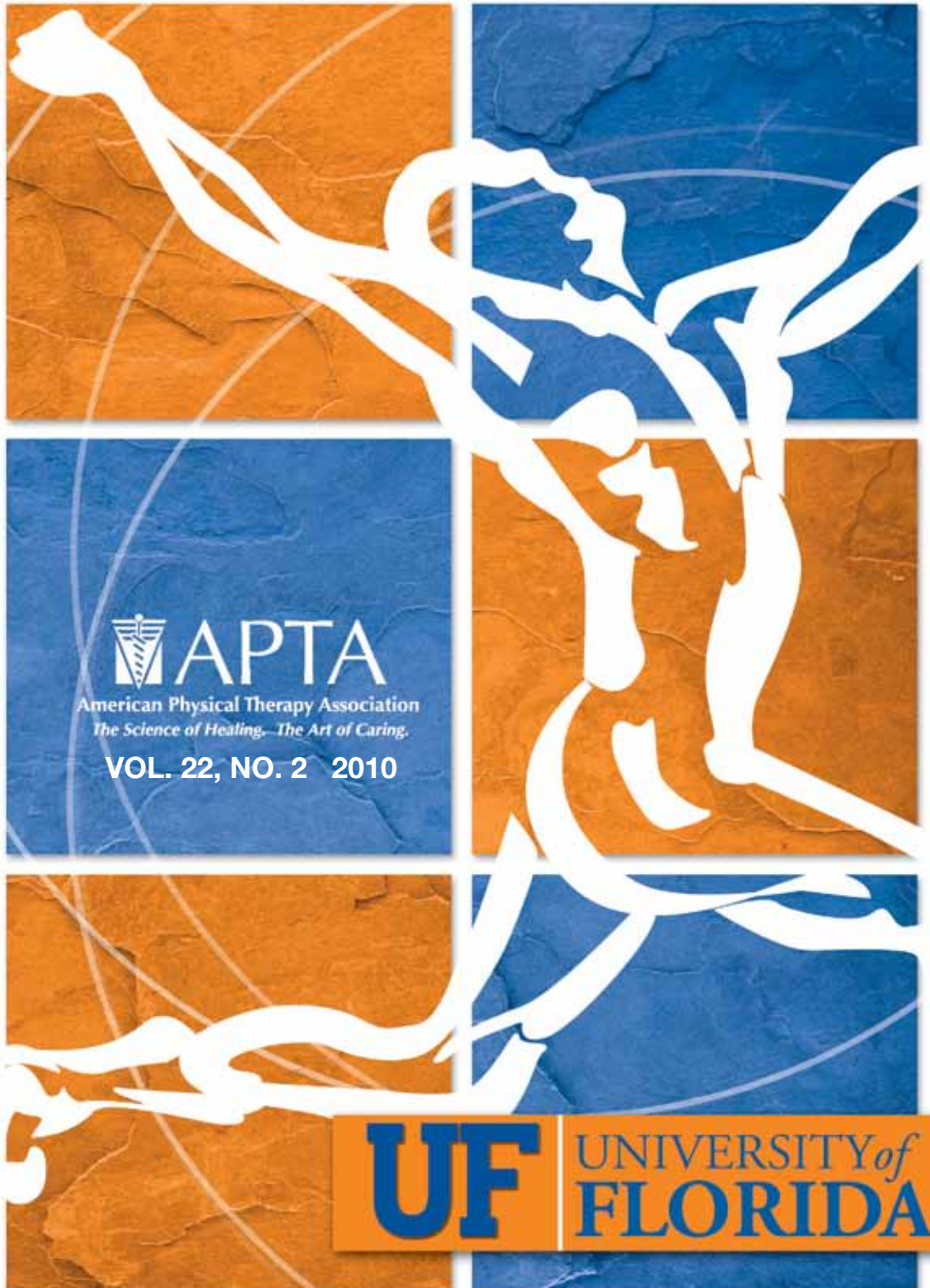



ORTHOPAEDIC

Physical Therapy Practice

THE MAGAZINE OF THE
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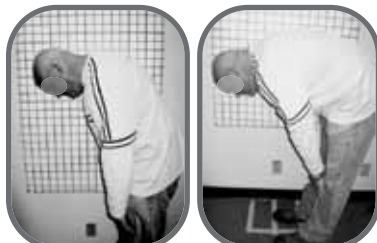
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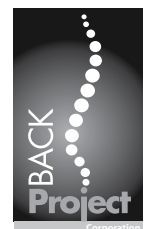
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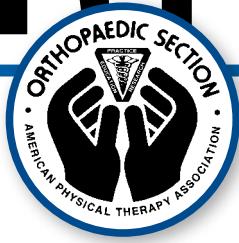


U.S. Patent Numbers: 6,656,098 & 6,749,548; European Patent Numbers: EP1264617B1 & EP1392406; Australian Patent Number: 2002305763; Japanese Patent Number: JP 4139769 B2 2008.8.27 and Other US & International Patents Pending

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ORTHOPAEDIC



Physical Therapy Practice

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

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Editor's Note

History Repeats Itself

Christopher Hughes, PT, PhD, OCS



*"This is like deja vu all over again."
- Yogi Berra*

Although this is not exactly an intellectual quote, it does appropriately sum up our second issue that is a result of the University of Florida's effort in once again answering my call for faculty-student research papers that appeared in our publication in 2008.¹

I was hoping a few more schools would have participated but nonetheless the compilation put forth by this group of "gator" student authors and faculty mentors serves us well this issue.

I applaud the students for their work and going the extra mile in not only fulfilling their PT education but also putting forth a bold effort in an attempt to nurture and support an evidence-based approach to clinical practice.

In this issue we have a nice selection of topics. Groth, Finney, and George use a case series design to track varied responses of patients who all have been diagnosed with cervical radiculopathy despite similar treatment approaches.

Patel and Bialosky make a case for including balance assessment and training for patients who have bilateral knee osteoarthritis. They found that the inclusion of balance training in this patient group can lead to improved function.

McCrea and George give us something to ponder with their investigation and subsequent positive findings related to the use of augmented soft tissue mobilization for the treatment of knee tendinopathies.

Goldman and Lentz share a case report that details the conservative management of patellar tendinosis in an Olympic weightlifter. They hypothesized that progressive eccentric overload exercise program would promote collagen synthesis and regeneration of the degenerative tendon. Improvements were seen with regard to a decrease in reported pain, and improved knee flexion ROM, and increased quadriceps strength.

The final paper by Cosgrave and Chmielewski details functional outcome changes during 16 weeks of rehabilitation for a patient following a knee dislocation with concomitant peroneal nerve injury. The authors document the use of novel performance

assessment tools using the IKDC rating form and sit-stand and 10 meter walk test in an effort to track and quantify progress.

The common denominator in all of these studies is the students' persistent attempt to translate didactic knowledge learned in their educational program to the clinical setting. Through writing one can only be optimistic that this initiative will continue to stimulate a "reflexive response" in postgraduation clinical experiences. The students made valid attempts to accurately assess, treat, document, and disseminate what it is they were doing in the clinic and tried to determine whether change has truly occurred. What more can one ask of an entry-level physical therapist or for that matter any veteran physical therapist?

In the guest editorial from the first issue commandeered by University of Florida, faculty member, Dr. Steven George informed us that evidence-based practice courses are taught once a year in their 3-year program to foster active learning and critical thinking. This seems pretty straightforward and logical. However he also mentioned the importance of reflection, a commonly cited component of evidence-based medicine.

Writing tends to demand reflection in a unique way. We at *OP* are happy to be a part of this act for students, as well as practicing clinicians. By submitting and finalizing their work for publication I believe these students have come full circle, not only in completing their program requirements for research at their university but through sharing their experiences with us.

Honestly, I think that's pretty cool stuff for a PT student! They can now springboard out into practice with eyes wide open,

brains in drive, and pencil in hand.

Once again my sincere thanks to the faculty and students at University of Florida for once again "answering the call!" I hope you enjoy this issue and the hard work these authors have put forth!

REFERENCE

1. Hughes C. A call for faculty-student papers. *Orthop Phys Ther Practice*. 2008;20(3):109.

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In this issue of *Orthopaedic Physical Therapy Practice*, the Orthopaedic Section leadership is pleased to present the 2010 – 2014 Orthopaedic Section Strategic Plan. The new Strategic Plan outlines several bold initiatives that will direct the Section's efforts and utilization of resources for the next 5 years. In this message, I will summarize the process that was used to develop the Strategic Plan and highlight some of the new initiatives outlined in the Strategic Plan.

The planning process for development of the Strategic Plan began in 2008 with the selection of a meeting facilitator and the creation of a membership survey. The survey addressed issues related to education (meetings and independent study courses), residency and fellowships, advocacy, and Section publications. The survey was administered electronically over the Internet from December 2008 through February 2009. Responses were received from 1345 Section members. The results were summarized and reviewed in preparation for the Strategic Planning Meeting.

The Strategic Planning Meeting was held October 9-10, 2009 in LaCrosse, WI and was attended by members of the Board of Directors; Chairs of the Education, Practice, Research, Membership, and Public Relations Committees; Coordinators for the Independent Study Course, *Orthopaedic Physical Therapy Practice*, ICF-Based Clinical Guidelines, and Residency and Fellowship Advisory Panels; and Orthopaedic Section office staff. The discussion began with review of successes of the prior Strategic Plan followed by an analysis of strengths, weaknesses, opportunities, and threats (SWOT analysis). Throughout the weekend, the results of the membership survey and the APTA Strategic Thinking Plan were used to frame the discussions.

Following review of the Section's Mission and Vision, the discussion focused on 5 areas: (1) standards of practice, (2) education and professional development, (3) public identity and promotion of physical therapy, (4) research, and (5) advocacy. Breakout sessions were used to develop the strategic outcomes and objectives for each of these areas.

After the meeting, a series of teleconferences were held to refine and finalize the Strategic Plan. A draft of the Strategic Plan was approved by the Orthopaedic Section Board of Directors during the December 14 conference call and the final version of the Strategic Plan was adopted on the March 8, 2010 conference call.

The Mission, Long Range Vision, Strategic Outcomes, and Objectives are printed on pages 65-66 of this issue of OPTP. Highlights of the Strategic Plan are as follows:

STANDARDS OF PRACTICE

- The Orthopaedic Section will continue to develop and publish evidence-based clinical practice guidelines that use the International Classification of Functioning and Disability (ICF) as a framework. To date the Section has published guidelines related to heel pain/plantar fasciitis, neck pain, and hip osteoarthritis. Guidelines for knee ligament instability, knee meniscus/articular cartilage injuries, hip labral injuries, Achilles tendinopathy, and low back pain are under review and are expected to be published in JOSPT by the end of 2010. By 2015 we expect to have a total of 15 evidence-based guidelines published and accepted by the National Guidelines Clearinghouse (www.guidelines.gov).
- The Orthopaedic Section will develop a National Orthopaedic Physical Therapy Outcomes Database. This database will be made available to Orthopaedic Section members to facilitate the collection of clinical and process outcomes of care provided by orthopaedic physical therapists. The National Outcomes Database will be developed to be consistent with the Evidence-Based Clinical Practice Guidelines that have been developed by the Section. Information from the National Outcomes Database can be used by individuals who submit data to evaluate and improve their clinical performance. Additionally, individuals with an interest in clinical research will

be able to submit proposals to access the data in the National Outcomes Database for clinical research.

EDUCATION AND PROFESSIONAL DEVELOPMENT

- The Orthopaedic Section will investigate the development of a series of continuing education courses to enhance psychomotor and clinical decision making skills for examination and treatment of orthopaedic conditions involving the cervicothoracic spine, upper extremity, lumbosacral spine, and lower extremity. It is expected that these courses will be offered regionally through partnerships with state chapters.
- The Orthopaedic Section will investigate the need for subspecialization in orthopaedic physical therapy and if warranted will develop a process to recognize subspecialists.
- The Orthopaedic Section will continue to promote the development of Orthopaedic Clinical Residencies with the goal of increasing the number of residencies by 100% from 2010 to 2015.

PUBLIC IDENTITY AND PROMOTION OF PHYSICAL THERAPY

- The Orthopaedic Section will establish strategic alliances with health care professional organizations to work towards the mutual goal of promoting care to individuals with musculoskeletal conditions.
- The Orthopaedic Section will provide resources and support for states that are seeking direct access legislation with the goal of increasing physical therapists' role as unrestricted direct access providers of musculoskeletal care throughout the United States.

- The Orthopaedic Section will increase its Internet presence to improve and promote the brand of physical therapists. This will include development of a coordinated social media strategy that maximize the Section's activity on social medial outlets such as Facebook, Twitter, Linked In, and YouTube.

RESEARCH

- The Orthopaedic Section will create a clinical research network to support multi-center clinical research. An Advisory Panel for the clinical research network will develop guidelines for the clinical research network and will create a request for proposals. The Section intends to provide resources to support the infrastructure that is necessary to conduct large scale multi-center clinical studies. A clinical research network will enable Section members to participate in and contribute to clinical research. Additionally the clinical research network will allow investigators to quickly and more efficiently recruit sufficient numbers of subjects to answer clinically meaningful questions related to diagnosis, prognosis, and treatment that might oth-

erwise require a long time to accumulate the required number of subjects if the research was conducted in a single center.

ADVOCACY

- The Orthopaedic Section will strengthen communications with state chapters by expanding its Chapter Liaison Network. Chapter Liaisons to the Orthopaedic Section are appointed by the Chapter and function to facilitate 2-way communication between the Chapter and the Section. Chapter Liaisons receive a monthly update of information from the Section that they are asked to share at Chapter and District meetings. Additionally Chapter Liaisons are asked to communicate any ideas that may help the Section better serve its members and to keep the Section appraised of relevant legislative/regulatory issues within the state.
- The Orthopaedic Section has established Advocacy Grants that Chapters can use to support legislative and regulatory issues that are of important to the practice of orthopaedic physical therapy. In 2010 the Section will fund up to 3 grants for

\$5,000 each. Chapters may use funding from the Orthopaedic Section to assist with financial costs of defending the scope of current and emerging areas of orthopaedic physical therapy practice, and supporting legislative and regulatory efforts related to grass roots advocacy efforts.

We hope that you will take time to review Strategic Plan in greater detail. The Section leadership believes that the 2010 – 2014 Strategic Plan will enable the Section to be the source of information for the orthopaedic physical therapist and will allow the Section to serve as an advocate and resource to foster quality patient care and promote professional growth. As always your comments regarding the Section's Strategic Plan are welcome. Please forward comments by calling the Orthopaedic Section Office at (800/444-3982) or by e-mailing the Executive Director at (tdeflorian@orthopt.org).

Orthopaedic Section, APTA, Inc. 2010-2014 Strategic Plan

MISSION

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

LONG-RANGE VISION

The Orthopaedic Section will be the source for the orthopaedic physical therapist

STRATEGIC OUTCOMES

Standards of Practice

Support the development and dissemination of outcome studies in peer reviewed journals that describe provision of orthopedic physical therapy consistent with current standards of practice.

Education/Professional Development

Increase the breadth and variety of educational and professional opportunities

Public Identity and Promotion of Physical Therapy

Orthopaedic physical therapists, recognized as experts of movement and musculoskeletal care, will realize increased utilization and recognition by consumers and professional groups

Research

Provide resources and support for conducting laboratory and clinical studies to expand the knowledge base for orthopaedic physical therapy and improve patient management.

Advocacy

The Orthopaedic Physical Therapist will be a portal into the healthcare system and be recognized by society as a specialist for the management of individuals with musculoskeletal conditions

STRATEGIC OUTCOMES, OBJECTIVES, STEPS AND ROLES 2010-2014

1. Standards of Practice

Support the development and dissemination of outcome studies in peer reviewed journals that describe provision of orthopedic physical therapy consistent with current standards of practice.

Objective A

Prior to 2015, have 15 ICF-based clinical practice guidelines for common musculoskeletal conditions gain acceptance for inclusion on the AHRQ's National Guidelines Clearinghouse (www.guidelines.gov)

Objective B

Develop a National Orthopaedic Physical Therapy Outcomes Database

2. Education/Professional Development

Increase the breadth and variety of educational and professional opportunities

Objective A

Assess possible emerging practice opportunities and if identified provide educational resources for specific practice areas.

Objective B

Assess the need for resources to enhance psychomotor and clinical decision making skills for orthopaedic physical therapists.

Objective C

Incorporate the use of electronic multi-media in OPTP and ISCs

Objective D

Create mechanisms for recognition in sub-specialization within orthopaedic physical therapy

Objective E

Promote the advancement and development of residency and fellowship programs

3. Public Identity and Promotion of Physical Therapy Orthopaedic physical therapists, recognized as experts of movement and musculoskeletal care, will realize increased utilization and recognition by consumers and professional groups

Objective A

Physical therapists will increase their role as unrestricted direct access providers of musculoskeletal care throughout the United States by 2015

Objective B

Develop an alliance with a minimum of 5 professional

organizations to work towards the mutual goal of promoting musculoskeletal care by 2015

Objective C

Increase Section Internet presence to improve branding and promotion of the profession by 2015

4. Research

Provide resources and support for conducting laboratory and clinical studies to expand the knowledge base for orthopaedic physical therapy and improve patient management.

Objective A

Establish a clinical research network to support multi-center orthopaedic physical therapy research

Objective B

Improve orthopaedic physical therapists' ability to translate and apply evidence into practice

5. Advocacy

The Orthopaedic Physical Therapist will be a portal into the healthcare system and be recognized by society as a specialist for the management of individuals with musculoskeletal conditions

Objective A

Serve as a resource to APTA and State Chapters to strengthen efforts to increase unrestricted direct access to physical therapists

Objective B

Serve as a resource to enhance reimbursement for services provided by orthopaedic physical therapists.

Objective C

Improve communication and advocacy efforts between Orthopaedic Section and State Chapters

I first met Geoff 20 years ago when I did an internship with him and Mark Jones in Adelaide, South Australia. At the time, there were almost no Maitland courses or instructors so I decided to call him directly to inquire about doing an internship with him. You could imagine how intimidating it was for a PT only 2 years out of school. Geoff was extremely approachable and very interested, particularly when he learned I was prepared to commit several months to this endeavor. I realized then, and even more now, what a rare and unique opportunity it was to spend one-on-one time with him in his clinic treating patients. I kept a diary of the experience and still go back to it to this day.

What impressed me most about Geoff was that a man who had accomplished so much and was a pioneer/visionary in orthopaedic physical therapy was so humble. He told me that he disliked having his name assigned to a treatment concept, but what bothered him the most was having his name used in conjunction with treatment “techniques” (as in “Maitland techniques”). He stated that if a PT said they were teaching Maitland “techniques” then they were not a Maitland-trained therapist. Rather, he preferred that his teachings be referred to as the Maitland “concept” because he felt that his emphasis was on the clinical reasoning (or “lateral thinking” as he would describe it) when treating a patient. He got frustrated that the literature would sum up his work as “graded oscillations to treat pain.”

Geoff always put his patients first and he did not mind if he was running an hour behind. The patients in the waiting room did not mind either because they knew that they would also receive the same comprehensive care when they were seen. Even with all his experience and wisdom, he was willing to let the patient guide the treatment and he listened to each patient in such detail. That still amazes me. This attention to detail would constantly lead him to new techniques and that was what the Maitland concept emphasized. There were times when he would look at me and say, “This is the first time I have done this technique, but the way the patient presented and what they told me lead me this way.”

He was always willing to change and learn new things from his patients, which

was how he came up with the slump test. He explained that he had a patient with thoracolumbar pain and after several treatments, the patient told Geoff that the only remaining complaint was that he could not flex his neck down enough to get into the car without bumping his head. Geoff mimicked the position and used it as a treatment.

I hope that Geoff will be remembered as much for his kindness, humility, and generosity as he will for his clinical and academic accomplishments. He was an amazing human being and his passing is a huge loss for the physical therapy community.

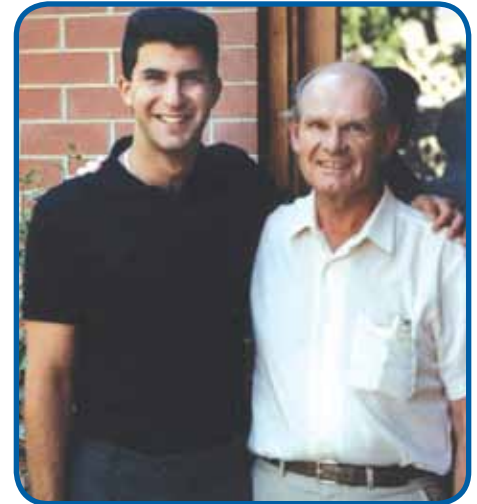
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OBITUARY: GEOFFREY MAITLAND MBE 27 AUGUST 1924 – 22 JANUARY 2010

The following represents an edited version of an original press release published by the Australian Physiotherapy Association (<http://www.physiotherapy.asn.au>).

One of the giants of the physiotherapy profession, Geoff Maitland passed away peacefully in Adelaide, January 22, 2010. Geoff was a pioneer in the field of manipulative physiotherapy. Underpinning his contribution was his ability to notice things which easily escape attention in the daily interactions with patients, to precisely describe these and to propose relationships between them. He put as much importance on learning derived when treatments didn't work, as when they did. Thus not only did Geoff provide the springboard for much research in physiotherapy but exemplified clinical reasoning long before it was formally taught.

Geoff was born in Adelaide, South Australia on 27 August 1924. He was a student at Prince Alfred College. In 1942, at the age of 18 he joined the RAAF. He was quickly drafted to England to learn to fly Sunderland bombers and to take part in the Battle of Britain. Under the Commonwealth



Brian Tovin and Geoff Maitland in Adelaide, South Australia, 1990.

Reconstruction Training Scheme for Ex-Servicemen, Geoff undertook the Diploma in Physiotherapy course at the University of Adelaide graduating in 1949. Following 2 years working in public hospitals in Adelaide, Geoff commenced in private practice in 1952 and also became a part time clinical tutor, a combination of clinical practice and teaching which he continued uninterrupted throughout his career.

A ‘special studies fund’ award gained by Geoff in 1961, enabled him to go overseas to study different methods of spinal manipulation (including those of Cyriax, Stoddard and Mennell). Writing in the *Australian Journal of Physiotherapy* in December 1963, in a paper entitled “The problems of teaching vertebral manipulation,” Geoff outlined a teaching approach that encompassed gentler mobilizing techniques as well as manipulative thrust techniques and a need to assess the anticipated progress with such treatment. Geoff published extensively. His texts on vertebral and peripheral manipulation (first published in 1964 and 1970 respectively) and his guide to musculoskeletal examination and recording have been published in many different languages.

Extraordinary generosity in sharing his knowledge and expertise was typical of Geoff Maitland. He was supportive not only of those who expanded on his work further, as well as those who questioned it. This was consonant with someone who saw himself as constantly learning and who deemed the pa-

tient to be his best teacher. Despite his busy practice and travel schedule, he remained a committed member of the clinical teaching staff of the South Australian School of Physiotherapy. One of Geoff's noted teaching contributions was his involvement in the 3-month Manipulation of the Spine course (established under the auspices of the Australian Physiotherapy Association) that commenced in Adelaide in 1965. This was the precursor to the Graduate Diploma in Advanced Manipulative Therapy offered by the South Australian Institute of Technology (now the University of South Australia) from 1974, subsequently to become a Masters degree in the early 80s. In 1977, Geoff commenced teaching in Switzerland, returning bi-annually for many years. The International Maitland Teachers Association was founded in Zurzach, Switzerland in 1992 with Geoff as its inaugural President.

Geoff was a visionary. He was one of the founders of the Manipulative Therapists Association of Australia (MTAA) in 1966 – now known as Musculoskeletal Physiotherapy Australia.

Geoff was also instrumental in the founding of the International Federation of Orthopaedic Manipulative Therapists (IFOMT), together with Gregory Grieve, Freddy Kaltenborn, and Stanley Paris in 1974. This special group of the World Confederation of Physical Therapy is a key international forum for musculoskeletal physiotherapists.

He received many awards and recognitions of his outstanding contributions. Amongst these were the WCPT Mildred Elson Award for International Leadership in 1995 and recognition from professional societies included an Honorary Fellowship from the Chartered Society of Physiotherapy, Honorary Associate Life Membership of the South African Society of Physiotherapy, Honoured Membership of the Australian Physiotherapy Association and Life Membership of the MPAA.

Geoff was the first president of the Australian College of Physiotherapists (1971-1977). He wrote the initial submission for Specialization in Manipulative Physiotherapy

in 1977. Geoff was also instrumental in the establishment of the Australian Journal of Physiotherapy and was the Business Manager for the Journal from 1954-1958. Geoff's level of commitment and accomplishments are quite overwhelming.

Geoff influenced countless physiotherapists in Australia and overseas. We acknowledge the passing of a truly great clinician, teacher, and mentor.

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Outcomes Following Augmented Soft Tissue Mobilization for Patients with Knee Pain: A Case Series

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ABSTRACT

Background and Purpose: There is a lack of evidence regarding conservative treatment of knee tendon disorders. Augmented soft tissue mobilization (ASTYM) is a novel massage technique for treating tendon disorders. Evidence supporting the effectiveness of ASTYM treatment is limited. The purpose of this case series was to describe outcomes of 11 patients with knee pain and associated tendon inflammation following 5 physical therapy treatment sessions that included ASTYM treatment. **Case Description:** Eleven consecutive patients who fit predefined inclusion and exclusion criteria were selected for participation in this case series. Patients exhibited signs and symptoms consistent with various knee tendinopathies. Patients completed 5 physical therapy sessions including an individualized exercise prescription and a standardized ASTYM treatment. Outcomes were assessed with the Lower Extremity Functional Scale (LEFS) and the Numeric Pain Rating Scale (NPRS) at baseline and after the fifth ASTYM treatment. **Outcomes:** Eleven patients began the study. Eight patients completed the study. For the 8 patients who completed the study, the mean improvement in pain scores was 2.9 (sd = 2.6) with a 95% confidence interval of 0.7 to 5.1. The mean improvement in LEFS was 7.3 (sd = 9.3) with a 95% confidence interval of -0.5 to 15.0. Fifty percent of the patients exhibited a clinically meaningful change in pain intensity scores, and 62.5% exhibited a clinically meaningful improvement in LEFS score. **Discussion:** The primary results of this case study demonstrate the potential effectiveness of ASTYM treatment in patients with various knee tendinopathies. A randomized clinical trial of patients with various knee tendinopathies would be useful in determining the efficacy of ASTYM for patients with knee pain.

Key Words: tendinitis, knee, augmented soft tissue mobilization

BACKGROUND AND PURPOSE

Knee pain, soreness, aching, or discomfort was the second most common musculoskeletal reason for physician visits in the United States in 2006, second only to back issues.¹ Knee pain can have many different sources including osteoarthritis, bursitis, meniscus tears, ligamentous damage, and tendinopathies. Knee pain with associated inflammation to the surrounding tendons affects many Americans annually. Specifically, the incidence of patellar tendinitis has been reported at 13.8% over a 2-year period among physical education undergraduates.²

There is a lack of evidence regarding conservative treatment of knee tendon disorders as surgical and conservative treatments have demonstrated limited success. For example, surgical and conservative treatments for patellar tendinopathy produced similar improvement in outcomes in a randomized controlled trial comparing the 2 interventions. In the surgical treatment group (n = 20), which consisted of a full thickness wedge shaped surgical excision of the abnormal patellar tendon tissue followed by a structured rehabilitation program including eccentric strengthening, only 5 were symptom free at 12 months. In the conservative treatment group (n = 20), which focused on eccentric strengthening, 5 underwent surgery after 3 to 6 months due to poor response to conservative treatment. Of the remaining 15 patients receiving conservative treatment, only 7 were symptom free at 12 months.³ Evidence for conservative treatment of iliotibial band syndrome was reviewed by Ellis and colleagues in 2000. They determined that there was a lack of evidence regarding conservative treatment for iliotibial band friction syndrome and no significant benefit from any conservative treatments in the treatment of iliotibial band friction syndrome.⁴ A PUBMED search of all available records using key words “hamstring AND tendinitis” and “hamstring AND tendinopathy” on April, 9, 2009 with “no limits” resulted in a total

of 9 unique results for the 2 searches. Of these 9 results, examination of the abstracts revealed no primary studies describing outcomes following conservative treatment of hamstring tendon disorders.

Lack of success with traditional conservative and surgical treatment interventions has led to investigation of innovative techniques for treatment of tendon disorders. Augmented Soft Tissue Mobilization (ASTYM) is a relatively new intervention among conservative treatment techniques for tendon disorders. The ASTYM treatment was developed from the theories of cross friction massage with the idea of magnifying the effect area of the treatment through the use of soft tissue mobilization tools, to prepare the tissue for remodeling.⁵ Cyriax first described the technique of cross friction massage, theorizing that it may assist in healing by modifying the remodeling of soft tissue after injury through controlled tissue damage, increased blood flow, and mild inflammation to create an environment to allow the tissue to remodel more normally.⁶ Physiological evidence for the use of cross friction massage for treatment of musculoskeletal disorders in animal models was reported by Stearns in 1940.⁷ However, an understanding of the potential healing mechanisms of cross friction massage continues to be developed.⁸ The ASTYM technique was developed as an expansion of these concepts in the mid-1990s through a collaboration between Ball State University and Ball Memorial Hospital in Muncie, Indiana.⁵ The ASTYM technique is a deep massage technique similar to cross friction, but longer massage strokes are made parallel to tissue fibers rather than perpendicular. Cross friction massage is traditionally performed by a therapist who uses her hands to perform the technique. This practice limits the area to which cross friction can be feasibly performed, and is taxing to the therapists hands. Augmented soft tissue mobilization allows a therapist to provide a deep massage technique to a

larger area while decreasing stress on the therapist's hands through use of a set of massaging tools.⁵ Preliminary evidence for physiological functional improvements in tendon healing resulting from ASTYM treatment has been demonstrated in animal studies.^{9,10}

Augmented soft tissue mobilization technique is followed by stretching and strengthening exercises to provide an appropriate stimulus to the tissue so that it may remodel along the lines of stress.⁵ Although direct clinical evidence supporting these theories is lacking, some studies have demonstrated that tissue loading provides a necessary stimulus to promote an enhanced healing process in animal models.^{11,12}

Evidence supporting the effectiveness of ASTYM treatment in humans is limited to several case studies¹³⁻¹⁵ and one randomized clinical trial.¹⁶ After both conventional physical therapy treatment and surgery failed to relieve this patient's symptoms, successful pain, range of motion, and function outcomes were reported following ASTYM treatment in a college football player with chronic ankle pain and fibrosis. A 42-year-old woman with chronic pain and paresthesia had limited success with wrist splints, but had clinically meaningful improvements in pain reports following 12 sessions of physical therapy including ASTYM treatment.¹⁴ A recreational cyclist with chronic elbow pain had failed to respond to multiple conservative treatments including physical therapy, occupational therapy, nonsteroidal anti-inflammatory drugs, oral prednisone, and corticosteroid injections over the course of over 2 years. Following 4 weeks of twice weekly physical therapy treatment including ASTYM, stretching, and therapeutic exercise, the patient's pain with activity improved.¹⁵

In a randomized trial investigating ASTYM, an improvement ($P < 0.05$) in functional impairment and subjective pain ratings was reported for subjects with patellar tendinitis in the ASTYM treatment group, but not in the comparison treatment group. Twenty subjects were randomized to ASTYM treatment or a comparison group of "traditional treatment." The traditional treatment group completed a program of stationary cycling, cross friction massage, therapeutic exercise, stretching, and cryotherapy 3 times per week for 4 weeks. The ASTYM group completed the same program, but received ASTYM instead of cross friction massage and cryotherapy. Patients were seen for treatment 2 times per week for

4 weeks. At 6 week follow up 10/10 subjects in the ASTYM group and 6/10 subjects in the traditional treatment group were considered resolved. The 4 unresolved subjects in the traditional group then received the ASTYM treatment group protocol and 2 of these subjects had resolution of symptoms.¹⁶ Augmented soft tissue mobilization may be appropriate for other knee tendinopathies, but these have not been described in the literature. The purpose of this case series was to describe outcomes of 11 patients with knee pain and associated tendon inflammation. Each patient received 5 physical therapy treatment sessions that included ASTYM treatment. This case series potentially adds to the literature by considering a wider variety of knee pathology than in the previously cited randomized clinical trial and by describing consecutive outcomes using validated self-report measures.

METHODS

Overview

Patients referred to the Idaho Sports Medicine Institute between 1/12/09 and 2/6/09 who fit predefined inclusion and exclusion criteria were selected for participation in this case series. Formal Institutional Review Board approval was not required because ASTYM was part of normal clinical care for this setting, and patient confidentiality was maintained when data were collected and reported. Eligible patients were educated on the basic theory and technique of ASTYM treatment, and asked if they were interested in trying the ASTYM treatment modality. Patients who agreed to undergo ASTYM treatments as a part of their physical therapy treatment were asked to participate in an anonymous study on the ASTYM treatment outcomes, and informed that involvement in the study would require them to complete questionnaires at baseline and after their fifth treatment. Subjects also were informed that they could discontinue ASTYM treatment or drop out of the study at any time.

Examination

Consecutive patients were interviewed regarding the onset and behavior of their symptoms and then underwent a standard examination. Lower extremity gross range of motion and manual muscle testing of knee extensors, knee flexors, hip abductors, hip internal rotators, and hip external rotators was assessed to determine range of motion and strength deficits, respectively. An-

terior drawer, posterior drawer, and valgus and varus stress testing were performed to rule out ligamentous laxity as a contributor to each patient's knee pain. Ober's test, prone knee flexion, supine straight leg raise, and dorsiflexion range of motion with knee straight and bent was assessed to determine flexibility deficits. Palpation of knee and peri-knee structures was performed to assess tenderness at different structures. Information from the examination was used to determine whether patients fit inclusion and exclusion criteria, and to determine which exercises would be appropriate to complement the ASTYM treatment.

Inclusion and Exclusion Criteria

For the purposes of this case series, the operational definition of nontraumatic knee pain is pain that developed insidiously and not resulting from a specific macrotrauma. Macrotrauma was operationally defined as pain, edema, and decrease in function resulting within 24 hours of a specific event. Common pathological diagnoses included in this definition of nontraumatic onset knee pain may include suprapatellar, infrapatellar, iliotibial band, pes anserinus, distal hamstring, popliteus, and/or proximal gastrocnemius tendinopathy. Patients were included in the study if they described a nontraumatic onset of symptoms including pain in a tendon around the knee, and exhibited tenderness to palpation over one or more tendons around the knee. Patients with ligamentous laxity as assessed by anterior drawer, posterior drawer, and valgus and varus stress tests were excluded from this study. Patients were excluded if they had a history of chronic systemic inflammatory or pain syndromes such as fibromyalgia or rheumatic diseases, were currently taking blood thinning medications, or had chronic lower extremity numbness or altered sensation.

Patient Characteristics

Eleven patients fit the inclusion and exclusion criteria and agreed to participate in this study. Participants included 6 males and 5 females with a mean age of 24.5 years and a median age of 19 years. Nine of the patients were collegiate athletes, of whom 3 were football players, 3 were softball players, 2 were soccer players, and 1 was a cross country runner. The other 2 patients were a recreational runner and a recreational exerciser. Four patient's symptoms were in their right leg, 4 patient's symptoms were in their left leg, and 3 patients had bilateral symptoms. Five patients exhibited signs and symptoms consistent with infrapatel-

Table 1. Patient Demographics and Individual Pain and LEFS Scores

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|--------------------------------|------|------|-------------|------|------------------|--------|--------|------|-----------------|-----------------|
| Age | 19 | 29 | 20 | 68 | 20 | 18 | 18 | 19 | 19 | 19 | 20 |
| Gender | M | F | M | M | F | F | F | F | M | M | M |
| Symptom side | L | R | L | B | R | B | B | L | L | R | R |
| Co-morbidities | Hernia repair, abdominal cysts | None | None | (B) knee OA | None | Asthma | Asthma | Asthma | None | None | None |
| Initial pain intensity _a | 8.5 | 5 | 8 | 8 | 10 | 5.5 | 8 | 6 | 8 | 5 | 7 |
| Final pain intensity _a | 6 | 4 | 7 | 4 | 2 | 5.5 _d | 8 | 4 | 3 | 5 _d | 7 _d |
| Meaningful change – pain intensity _b | Y | N | N | Y | Y | N | N | N | Y | N | N |
| Initial LEFS _c | 46 | 48 | 50 | 35 | 68 | 70 | 53 | 54 | 47 | 65 | 47 |
| Final LEFS _c | 56 | 61 | 60 | 51 | 72 | 70 _d | 39 | 62 | 58 | 65 _d | 47 _d |
| Meaningful change - LEFS _e | Y | Y | Y | Y | N | N | N | N | Y | N | N |

^a Initial and final pain intensity scores are scores on a 0-10 scale where 0 = “no pain” and 10 = “worst pain imaginable”. Initial pain intensity is “worst pain in last week” Final pain intensity is “worst pain since last Physical Therapy treatment”

^b A meaningful change for the Numeric Pain Rating Scale was considered to occur at >2.2.

^c Initial and Final LEFS scores are out of a maximum of 80 where 80 = “No difficulty” with any activities and 0 = “Extreme difficulty or unable to perform” all activities listed in LEFS.

^d These scores were carried over as final scores from the initial scores due to patients not completing the study.

^e A meaningful change for the LEFS was considered to occur at >9.

lar tendinopathy, of which one patient also exhibited signs and symptoms of Osgood-Schlatter syndrome. The remaining patients exhibited signs and symptoms of patellar tendinopathy (n = 2), distal medial hamstring tendinopathy (n =2), iliotibial band tendinopathy (n =1), popliteal tendinopathy (n = 1), and suprapatellar tendinopathy (n = 1).

Intervention

Upon completion of the examination, patients completed the exercise prescription that was tailored to their individual impairments and included a standard ASTYM treatment. Each patient rode a bike

for 5 minutes as a warm-up activity. After warming up, each subject was instructed on individualized stretches based on her specific flexibility deficits as determined in the examination. Patients were instructed to adjust the intensity of the stretch to achieve a position where they felt a moderate stretch sensation and to hold the stretch for 30 seconds. Patients were monitored while performing each stretch for the first time and stretching form was corrected as needed. After stretching, the ASTYM technique was performed by a certified ASTYM provider on the affected lower extremity. The technique consists of repeatedly gliding glass or hard plastic tools across the skin, applying

pressure as tolerated, parallel to the alignment of the tissue fibers beneath, using cocoa butter as a lubricant. A broad surfaced tool is used first, followed by two progressively smaller tools. The technique was described in detail by Fowler and colleagues in 2000.⁵ The application of ASTYM technique took approximately 15 minutes. Following the ASTYM technique, the patient was instructed to repeat the stretches performed prior to ASTYM. Patients were then taken through a series of individualized strengthening exercises focused on eccentric and concentric strengthening and stability of the lower extremities. Exercises were modified based on specific strength deficits

Table 2. Mean Demographics and Pain Intensity and LEFS Scores

| Variable | Mean/ % _a | Standard Deviation |
|--------------------------------|--------------------------|--------------------|
| Age | 24.5 | 14.8 |
| Gender | 45% (50%) _b | _____ |
| Co-morbidities | 45% (50%) _c | _____ |
| Initial pain intensity | 7.2 | 1.6 |
| Final pain intensity | 5.0 | 1.9 |
| Final – Initial pain intensity | 2.1 | 2.6 |
| Meaningful change | 36% (50%) _d | _____ |
| Initial LEFS | 53 | 10.7 |
| Final LEFS | 58.3 | 9.8 |
| Initial – Final LEFS | 5.3 | 8.5 |
| Meaningful change | 45% (62.5%) _d | _____ |

^a Percentages are presented including all 11 patients who began the study (including only the 8 patients who completed the study).

^b Percentage of females.

^c Percentage of patients reporting at least one co-morbidity.

^d Percentage of patients who had a change greater than or equal to the meaningful clinically important difference for that measure.

determined at each subject's evaluation. Each subject was then given a home exercise program of stretching and strengthening exercises based on her specific deficits as determined in the evaluation. Patients were instructed to perform stretches 3 to 5 times per day, and to perform strengthening exercises 3 to 4 times per week. It was recommended that patients scheduled 2 visits per week for ASTYM treatment and progression of exercises. Subjects were scheduled either 2 times per week or one time per week based on their ability to come to Idaho Sports Medicine Institute for treatment. Subjects were seen for 4 additional visits for ASTYM and progression of therapeutic exercises.

Tests and measures

Function and pain were assessed with self-report questionnaires at baseline and after the fifth ASTYM treatment.

Lower Extremity Functional Scale (LEFS):

The LEFS is a self report measure used to assess decreases in function secondary to impairments to the lower extremities.¹⁷ Construct validity has been demonstrated using a good (r = .80) correlation with the SF-36 physical function subscale scores, and moderate correlation (r = .64) with the SF-36 physical component scores. Excellent test-retest reliability (r = .94) also was exhibited over a period of 24 to 48 hours.¹⁷ Binkley and colleagues also reported minimum detectable change and minimum clinically important difference scores of 9 points in consecutive patients with any lower extremity musculoskeletal condition referred for physical therapy.¹⁷

Pain Intensity:

Pain intensity data were collected by asking each subject to rate her pain on a 0-10 Numeric Pain Intensity Rating Scale where 0 means no pain and 10 is the

worst pain imaginable. The Numeric Pain Intensity Rating Scale was chosen for this study for its ease of use in a clinical setting and because its concurrent and predictive validity have been reported.^{18,19} Reliability has been reported with an Intraclass Correlation Coefficient of 0.61.²⁰ A minimum change value of 1.99 at one week follow up and minimum clinically important difference values of 2.2 at 1 week follow up and 1.5 at 4 week follow up have been reported in patients with low back pain referred to physical therapy.²⁰

RESULTS

Eleven patients began the study and 8 patients completed the study. Individual outcomes are reported in Table 1 and aggregate outcomes are reported in Table 2. The 3 patients who did not complete the study dropped out due to scheduling conflicts. Statistical analyses with and without subject dropout data were presented in this paper. For the analysis that included all data, patients had their baseline score input as the follow-up score. With all 11 patients included, the mean improvement in pain scores was 2.1 (sd = 2.6) with a 95% confidence interval of 0.4 to 3.9. The mean improvement in LEFS was 5.3 (sd = 8.5) with a 95% confidence interval of -0.4 to 11.0. With all 11 patients included, 36% exhibited a clinically meaningful change in pain intensity score and 45% exhibited a clinically meaningful improvement in LEFS score.

Statistical analysis, excluding patient dropout data, was also performed. For the 8 patients who completed the study, the mean improvement in pain scores was 2.9 (sd = 2.6) with a 95% confidence interval of 0.7 to 5.1. The mean improvement in LEFS was 7.3 (sd = 9.3) with a 95% confidence interval of -0.5 to 15.0. In the smaller sample analysis, 50% exhibited a clinically meaningful change in pain intensity score, and 62.5% exhibited a clinically meaningful improvement in LEFS score.

DISCUSSION

The results of this study will be discussed based only on statistical analysis of the 8 patients who completed the study because the purpose of this case series was to describe outcomes of patients following 5 physical therapy treatments including ASTYM. Discussing the smaller sample statistical analysis allows us to discuss the outcomes of only the patients who received these 5 treatments. Also, statistical analyses for both data sets did not differ much sta-

tistically, suggesting that the 3 patients not completing the study exerted minimal influence on the statistical outcomes. The primary results of this case study demonstrate the potential effectiveness of ASTYM treatment in patients with knee pain due to various tendinopathies. Patients exhibited a statistically significant improvement in pain intensity scores, but not LEFS scores. Clinically meaningful improvements in pain intensity were seen in 50% of patients, while clinically meaningful improvements in LEFS score were seen in 62.5% of patients. The author would consider clinically meaningful change in >75% of patients completing the study as a benchmark for considering the intervention protocol successful. Possible reasons for the lower rate of meaningful improvement include the low number of treatments before follow up and the amount of time from start of treatment to follow up. It is possible that more treatment sessions may be needed to achieve maximal improvements. Additionally, evidence suggests that tendinopathies are difficult to treat, and the percentage of patients with clinically meaningful improvements may be representative of the recalcitrant nature of tendinopathies. It is also acknowledged that a comparison treatment group would have offered more information regarding the relative effectiveness of ASTYM. We recommend investigating the ASTYM technique in a clinical setting that serves an active, athletic population, to treat patellar tendinopathies, as well as other recalcitrant overuse diagnoses, particularly those that have not responded to a therapeutic exercise program of treatment.

Some interesting gender differences in outcomes were apparent in this study for function and pain intensity. All males, but only 25% of the females who completed this study exhibited a clinically meaningful improvement in LEFS score. Three patients had a clinically meaningful change in both pain rating and LEFS. These 3 patients were all male, but did not share any other characteristics. Of the 4 females who completed the study, only one had a clinically meaningful change in pain intensity rating, and only one had a clinically meaningful change in LEFS score. Of the 4 males who completed the study, 3 had a clinically meaningful change in pain rating and 4 had a clinically meaningful change in LEFS score. Although we can only speculate based on the results of this case series, it is possible that males are more responsive than females to ASTYM treatment. Physiological studies regarding potential gender differences in tissue healing



and analgesic response may shed light on potential causes of the differences in outcomes in this study. Patients reporting one or more co-morbidities exhibited similar outcomes as those reporting no co-morbidities, which was an unexpected finding. Collecting comorbidity data in a larger sample size, with a larger variety in co-morbidities, would allow for further investigation of the influence of co-morbidities on ASTYM outcomes.

The ASTYM Web site offers information on treatment of 20 diagnoses including various tendinopathies and lists over 850 clinics that provide ASTYM in the United States. A single randomized controlled trial demonstrating ASTYM's effectiveness in patellar tendinitis and 3 published case studies seems to be a limited amount of evidence to support this scope of use of ASTYM with varied diagnoses. Becoming an ASTYM provider requires a 3-day training course, and tools must be rented from Performance Dynamics for an annual fee. Augmented soft tissue mobilization treatment may be a useful tool for improving patient outcomes, but more research is needed to support its use with diagnoses other than patellar tendinitis. Augmented soft tissue mobilization treatment is a time commitment for a patient and provider, and its clinical utility should be better investigated.

An appropriately powered randomized clinical trial of patients with various knee tendinopathies would be useful in determining the treatment effects of ASTYM in this population. A trial with a longer duration of treatment with multiple follow ups throughout treatment and a long-term follow up several weeks or months after completion of treatment would help determine the effect of ASTYM on patients with tendinopathies, and the quantity of treatment that is required to achieve the maximum potential effect. Potentially interesting comparison groups could include a group receiving an individualized therapeutic exercise program including strengthening, stretching, and stability exercises with no ASTYM, a group receiving cross friction massage specifically to the painful tendon in place of ASTYM, or a group receiving only recommendations for rest and avoidance of

painful activities. Additionally, comparisons of data among different ages, genders, occupations, and co-morbidities could help to determine what patients are most likely to benefit from ASTYM treatment that could provide clues as to matching treatment based on clinical presentation. The LEFS and numeric pain intensity ratings appear to be appropriate outcome measures for a randomized clinical trial. Additionally, a physical performance measure such as a single leg hop test might provide useful information regarding a patient's likelihood of success in sport activities.

The limitations of this study that should be considered when interpreting these results include the case series design approach that does not allow for cause and effect determination, and lack of a long-term follow up. Duration of treatment and number of treatment sessions also may be considered a limitation as a longer duration or increased number of ASTYM treatment sessions may be required before maximal outcome is reached. Additionally, the ASTYM treatment was included as a part of a total treatment plan including stretching, strengthening, and activity modification that limits our ability to solely attribute patient outcomes with the ASTYM intervention.

CONCLUSION

The 8 patients who completed this study exhibited a statistically significant improvement in pain intensity ratings but not in LEFS following 5 physical therapy treatments including ASTYM. Males exhibited better outcomes than females, and presence of co-morbidities did not appear to influence outcomes. Additional studies are needed to determine the efficacy of ASTYM, to determine which patients may benefit from ASTYM, and to determine the potential mechanism of ASTYM effect.

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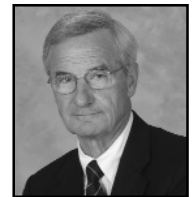
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| Cincinnati, OH | Furto | Aug 4 - 8 |
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| Minneapolis, MN | Furto | Sep 22 - 26 |
| San Francisco, CA | Yack | Sep 22 - 26 |
| St. Augustine, FL | Viti | Sep 29 - Oct 3 |
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| Chicago, IL | Irwin | May 7 - 9 |
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| Baltimore, MD | Viti | Jun 4 - 6 |
| Milwaukee, WI | Yack | Aug 27 - 29 |
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| St. Augustine, FL | Viti | Dec 3 - 5 |
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The Use of Eccentric Overloading Exercise for the Treatment of Patellar Tendinosis in an Olympic-style Weightlifter: A Case Report

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¹This manuscript was completed while enrolled in the University of Florida Doctor of Physical Therapy Program, Gainesville, FL

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ABSTRACT

Study Design: Case report. **Background and Purpose:** The purpose of this case

report is to describe the conservative management of patellar tendinosis in a college-aged Olympic-style weightlifter using a rehabilitation protocol focusing on eccentric overloading of the affected patellar tendon.

Case Description: An 18-year-old male, competitive Olympic-style weightlifter presented to the clinic with complaints of aching pain at the proximal insertion of the right patellar tendon into the inferior patella limiting his ability to perform knee-flexing activities and his ability to perform his sport for the previous 2.5 months. A diagnosis of patellar tendinosis was supported by the physical examination and subjective history. The patient's quadriceps strength, knee range of motion (ROM), and reported pain were monitored over time. The patient's functional progress was monitored throughout the patient's rehab using 4 reliable and validated self-report questionnaires. **Intervention:** Treatment consisted of independent stretching of the quadriceps, resistive strengthening of the gluteus medius and quadriceps, eccentric overloading of the quadriceps and patellar tendon, and proprioceptive/balance activities for the knee complex. As the primary focus for strengthening, a progressive eccentric overload exercise program was used in order to promote collagen synthesis and regeneration of the degenerative tendon.

Outcomes: The patient had improvements in reported pain, knee flexion ROM, and quadriceps strength of the affected knee. Improvements were also seen in all functional questionnaires from initial evaluation to discharge. **Discussion:** Currently, there is no preferred treatment for patellar tendinosis. Eccentric exercise training has been described with successful results in the treatment of this condition both in the literature and with this patient, but no optimal protocol has been described.

Key Words: patellar tendinosis, weightlifter, eccentric overload

INTRODUCTION

Patellar tendinopathy, also known as "Jumper's Knee," is a common pathology affecting athletes at all levels across many sports.¹ Those participating in jumping sports such as volleyball and basketball are most often affected.¹⁻³ Patellar tendinopathy, however, has also been known to affect nonjumping athletes in which high leg extensor speed, power, and eccentric demands are placed on the knee extensor mechanism, such as those participating in Olympic-style weightlifting.¹⁻³

Olympic-style weightlifting requires the athlete to perform controlled, high force movements at the knee. It has been estimated that forces 17 times the weightlifter's body weight are acting through the patellar tendon during heavy-weighted lifts such as the "snatch" and "clean and jerk."⁴ During these lifts, the athlete's knees quickly and repeatedly go through the full range of motion (ROM) at high speeds, and the patellar tendon must control the motion concentrically and eccentrically. During a 6-year study performed at the US Olympic Training Centers at Colorado Springs and Lake Placid, the knee was the second most commonly injured site (n = 107) of the 560 training related injuries occurring in Olympic-style weightlifters. Of those 107 knee injuries, 85.1% of them were designated as knee tendinitis.⁵

There is much confusion in the literature and within the clinical setting regarding the terminology of tendon conditions. "Tendinopathy" is a broad term referring to a tendon injury without specifying a particular pathology. Tendinopathy can then be subdivided into tendinitis and tendinosis with the difference being the underlying pathology. "Tendinitis" implies an acute inflammatory process is taking place while

"tendinosis" refers to a chronic degeneration of a tendon due to failed healing without an inflammatory process present.⁴ While imaging and histologic studies are the gold standard in the diagnosis of these two conditions, a clinical history and examination may be helpful in determining one diagnosis over the other.⁶ Tendinitis is considered a rare, acute condition and is likely to be reported by the patient as responding to anti-inflammatory treatments.^{2,7} Tendinosis, however, is a much more common and chronic condition. The patient suffering from tendinosis is likely to report this as a long-term issue that has not responded well to anti-inflammatory interventions.^{2,7} It is this confusion in terminology and difficulty with diagnosis that may interfere with optimal treatment since the focus in treating tendinitis would be on decreasing inflammation while the treatment of tendinosis would be on promoting collagen synthesis and strengthening.⁷

Once a tendinosis diagnosis has been established, the treatment focus becomes stimulation of collagen synthesis in order to reverse the degeneration of the tendon. While many conservative management options exist for patellar tendinosis, many lack the evidence to support their use, especially in collagen synthesis.^{2,6} Exercise in general has been shown to increase collagen synthesis in peritendinous connective tissue.⁸ Recent literature has demonstrated promising results in the treatment of tendinopathy using eccentric exercise.^{2-4,7,9-11} A 2007 study by Langberg et al¹¹ demonstrated that a 12-week program of eccentric exercise may be associated with increased rates of collagen synthesis in subjects with Achilles tendinosis. Recent studies have been able to demonstrate the advantages of eccentric exercises in treating patellar tendinosis versus surgical treatment and other types of conservative management. Bahr et al³ supported the use of eccentric training as a "low-risk and low-cost" alternative to

open tenotomy surgery in the treatment of patellar tendinosis since no advantage was demonstrated in surgical subjects over the eccentric training subjects participating in the study. Additionally, Alfredson and colleagues^{9,10} published 2 articles supporting the use of eccentric exercises in the treatment of patellar tendinosis. While there is literature to support the use of eccentric exercises in treating patellar tendinosis, the underlying mechanisms for its benefits are debated. Several theories have been proposed to explain these benefits including: (1) eccentric exercises generate a loading-induced hypertrophy that produces collagen and increases tensile strength of the tendon, (2) eccentric exercises produce a stretching effect lengthening the muscle-tendon unit and reducing strain on the tendon, and (3) eccentric exercises damage the neovascularization found in degenerative tendons that may be responsible for the patient's pain.^{4,6,11}

With encouraging results found in the literature, the use of eccentric training has gained support in the treatment of patellar tendinosis. Despite the lack of evidence for an optimal protocol in the prescription of eccentric exercise interventions, researchers continue to suggest varying treatment programs producing positive results. The purpose of this case report is to describe the conservative management of patellar tendinosis in a college-aged Olympic-style weightlifter using a rehabilitation protocol focusing on eccentric overloading of the affected patellar tendon.

CASE DESCRIPTION

History

The patient was an 18-year-old male, competitive, Olympic-style weightlifter who presented to our outpatient physical therapy clinic with complaints of aching pain at the proximal insertion of the right patellar tendon into the inferior patella. The patient was experiencing these symptoms for the previous 2.5 months following a sudden onset of excruciating knee pain while performing a jerk during competition. During those 2.5 months, the patient abstained from weightlifting activities that required motion at the knee and began taking nonsteroidal anti-inflammatory drugs (NSAIDs) and using cryotherapy for pain and inflammation. The patient decided to see his physician and was then referred to physical therapy when his symptoms failed to improve despite rest and anti-inflammatory interventions. The patient reported

that the radiographs taken were negative. The patient denied any prior physical therapy for the current condition.

At the time of initial evaluation, the patient's subjective report revealed that his condition was aggravated by ascending/descending stairs, squatting/kneeling, and performing weightlifting maneuvers, and was temporarily eased by rest. A visual analog scale (VAS) was used to measure the patient's reported levels of patellar tendon pain at the initial evaluation and the start and completion of each treatment session. The VAS is a reliable ($r = 0.97$) 11-point Likert Scale ranging from 0 to 10 in which 0 is no pain and 10 is the patient's worst pain imaginable.¹² At best and at the time of evaluation, the patient's patellar tendon pain was a 3/10, and at worst, an 8/10. The patient also reported that his pain had increased in intensity and frequency since the time of his initial injury.

The patient reported a past medical history of bilateral knee pain secondary to abnormal lateral tracking of the patella. He stated that this occurred 2.5 years ago and that he was prescribed patella tracking braces and physical therapy but chose to forgo physical therapy since the braces were relieving his pain. The patient reported he was wearing both braces at the time of his current injury.

Patient Examination

Upon examination, the patient ambulated independently without significant gait abnormalities. A standing postural screen revealed no significant findings and leg length screenings were unremarkable. Physical examination of the knee indicated patellar crepitus, bilaterally, right greater than left, with normal tracking of the patella during active knee extension from 90° to 0° of flexion. However, a patellofemoral compression test, also known as the McConnell Test,¹³ was negative, bilaterally. Patellofemoral joint mobility testing in all planes did not reveal any limitations, bilaterally.

Range of motion measurements of the knee were 10°/0°/140° and 10°/0°/145° for the right and left, respectively using standard landmarks as outlined by Norkin and White.¹⁴ The literature indicates that goniometric measurements of the knee joint are both reliable ($r = .98$) and valid ($r = .97-.98$).¹⁵ Manual muscle testing (MMT) of the hamstrings, gluteus medius, and quadriceps were tested in standard positions.¹⁶ The strength of the hamstrings were a 5/5 bilaterally; gluteus medius strength was 5/5

on the right and 4+/5 on the left; quadriceps strength was 4+/5 on the right with pain during manual loading, and 5/5 on the left. Florence et al found that MMT is reliable in measuring knee strength ($r = .93$).¹⁷ Lower extremity flexibility was measured using positions outlined by Dutton¹³ for hamstring, iliotibial band, quad, hip flexor, and soleus length. Using a prone knee flexion test,¹³ only a minimal limitation was found in the flexibility of the right quadriceps as exhibited by the patient's inability to touch his right heel to his buttocks.

Upon observation of the bilateral knees, there was no visible redness, increased heat, or swelling. Palpation of the right knee revealed tenderness at the proximal insertion of the patellar tendon. Cook and colleagues¹⁸ has found moderate to severe tenderness during palpation of the proximal third of the patellar tendon and its insertion into the patella to be a predictor of patellar tendinopathy in young athletes. The patient's patellar tendon pain was further exacerbated in performing a quad set. Additional testing included unsupported bilateral and single leg squat tests.¹³ During both squat tests, the patient experienced painful popping and clicking in the right knee with deep knee flexion and during the ascending portion of the squat.

In addition to the tests performed during the examination that would be used to monitor the patient's impairment outcomes, the patient was asked to fill out a number of surveys that would be used to monitor his self-reported functional progress throughout treatment. The following functional outcome surveys were used: The Lower Extremity Functional Scale (LEFS), The Cincinnati Knee Rating System (Cincinnati), The International Knee Documentation Committee Subjective Knee Form (IKDC), and the Victorian Institute of Sport Assessment (VISA). The LEFS was used to evaluate general lower extremity physical function. Both the Cincinnati and IKDC more specifically focused on the knee, with the Cincinnati monitoring knee impairments and function, and the IKDC monitoring function in sport in addition to function during activities of daily living. The VISA, specifically designed to monitor patellar tendinopathy, tested similar constructs to those found in the other questionnaires but was used in this case because it contains items focusing on the amount of time the patient is able to participate in sporting activities based on 3 categories. These 3 categories ranged in severity from

“pain that stops you from completing sport activities,” to “pain while undertaking sport activities but it does not stop you,” and, finally “no pain while undertaking sport activities.” The patient would be questioned on the amount of time he was able to participate in sports based on the category he fell into at that point in his rehabilitation and his score would be weighted according to the level of function reported. All of the stated tests were found to be reliable, valid, and responsive to change in evaluating their given patient population as seen in Table 1.

Patient Evaluation

Examination revealed ROM, strength, and flexibility impairments in the right knee compared to the left knee and tenderness to palpation of the patellar tendon at its attachment into the patella. In evaluating these findings, the following differential diagnoses were considered: patellofemoral pain syndrome (PFPS), patellar tendinitis, and patellar tendinosis. Patellofemoral pain syndrome was the first consideration as the patient complained of many of the symptoms consistent with this diagnosis including aching anterior knee pain, retropatellar pain, and pain with knee-flexing activities such as squatting and stair ascending/descending. The patient also had reported a history of lateral tracking of the patella in each limb, which is another finding consistent with PFPS. Although the examination revealed normal tracking of the patella and a negative patellofemoral compression test, PFPS could not be ruled out as a diagnosis based on the patient’s reported symptoms. Regardless of this finding, this does not address the patient’s primary complaint of point tenderness directly over the patellar tendon, which is a common symptom of a patellar tendinopathy.² In instituting a plan of care for this patient, it would be helpful to establish the underlying pathology of this tendinopathy. Based on the patient’s history of a poor response to anti-inflammatory interventions such as NSAIDs and ice, the patient’s 2.5 month time from injury, and the lack of localized swelling and erythema evident during examination, it was hypothesized that the patient was likely suffering from a necrotic, rather than inflammatory, condition. Patellar tendinitis is defined as an acute inflammation of the patellar tendon;⁴ therefore, this diagnosis was eliminated from consideration. Patellar tendinosis, however, is a chronic degeneration of the patellar tendon without a present inflammatory process, and consequently, it was

Table 1. Overview of Functional Outcome Measure Questionnaires

| | Construct | Reliability | Validity | Standard Error of Measure |
|---|--|---------------------------|-------------------------|---------------------------|
| Lower Extremity Functional Scale ¹⁹ | Lower extremity physical function | $\alpha = .96$ R = .86 | $r = .80$ | 3.9 |
| Cincinnati knee-rating system ²⁰ | Knee impairment and physical function | R = .88 | $r = .68$ | 10 |
| International Knee Documentation Committee Subjective Knee Form ²¹ | Knee-specific symptoms, function and sports activity | $\alpha = .92$ R = .95 | $r = .47 - .66$ | 9 |
| Victorian Institute of Sport Assessment Scale ²² | Severity of Patellar Tendinosis | R = .95 | Not found in literature | 3 |

established that the patient presented with signs and symptoms consistent with patellar tendinosis. Intervention was directed toward treatment of the pathology and impairments associated with this diagnosis.

Intervention

The patient was seen for 11 visits (including the initial evaluation) over a span of 6 weeks. During that time, treatment was focused on addressing those functional deficits and impairments found during the initial evaluation. Treatment addressed ROM, strength, flexibility, and functional limitations through a progressive program of independent stretching of the quadriceps, resistive strengthening of the gluteus medius and quadriceps, eccentric overloading of the quadriceps and patellar tendon, and proprioceptive/balance activities for the knee complex. The specific interventions used each visit are outlined in Table 2.

The primary focus of the strength training component of the patient’s treatment was eccentric overloading of the quadriceps and patellar tendon. The supine shuttle, step downs, heel taps, leg press, and mini-squats were prescribed with emphasis on overloading the eccentric phase of the exercise in order to improve tensile strength and promote tendon regeneration. These exercises were initially prescribed in order to improve the patient’s mechanics and eccentric control at the knee. The patient was asked to focus on keeping his right knee pointing in the same direction as his toes during all exercises in order to reduce the rotary forces on the knee. He was also told to not allow his knee to extend beyond his toes during shuttle and squats in order to reduce torque forces acting on the knee.

Both of these motions increase torque forces and rotary stresses acting on the knee and increase the likelihood of injury.^{23,24} The knee extension machine was used in a more focused effort to strengthen the right quadriceps. During all leg presses, mini-squats, and knee extension exercises, the patient was instructed to perform the eccentric quadriceps phase with his right lower extremity only and to use both lower extremities during the concentric quadriceps phase. In all resistance exercises completed by the patient, the weight initially lifted by the patient was 70% of a one repetition maximum for his right lower extremity and was then progressed over time to 100% of a one repetition maximum.

As the patient was able to competently perform the exercises with proper biomechanical technique and reduced pain, the focus of the squat exercises changed to increasing strength of the quadriceps and increasing the load through the patellar tendon in order to improve tensile strength and encourage collagen synthesis. At visit 5, the patient began performing squats on a 25° decline. The purpose of the 25° decline was to increase the demands on the knee extensor mechanism by relaxing the gastrocnemius muscle complex.^{9,10} Initially the patient performed the decline squat without additional weight and facing a wall in order to use the wall for balance as necessary. During the squat, the patient stood on the decline board with his full weight on the right lower extremity. He was instructed to keep the trunk as vertical as possible in order to minimize activity of the gluteal muscles⁹ and slowly flex the right knee to 70° in order to guarantee that his knee was beyond the 60° position, the joint angle considered

Table 2. Treatment Intervention Flow Sheet for Each Patient Visit

| | 1: IE | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|------------|-----------------|-------------------------|----------------------------------|----------------------------------|---|---|---|---|---|--|
| Bike warm-up | | 10 min | 10 min | 10 min | 10 min | 10 min | 10 min | 10 min | 10 min | 10 min | 10 min |
| Cross Friction Massage to the patellar tendon | 10 min | 5 min | 5 min | 5 min | 5 min | 5 min | | | | | |
| Prone Knee Flexion Stretch | 2 x 30 sec | 2 x 30 sec | 2 x 30 sec | 2 x 30 sec | 2 x 30 sec | 2 x 30 sec | 2 x 30 sec | 2 x 30 sec | 2 x 30 sec | 2 x 30 sec | 2 x 30 sec |
| *Mini-squats | | ball squat 3x15 | ball squat 3x15, 25 lbs | ball squat 4x10, 25 lbs | 25° decline board 3x15 | 25° decline board 2x15; Smith machine with decline board 1x15, 50 lbs | Smith machine with 25° decline board 4x15, 70 lbs | Smith machine with 25° decline board 4x10, 80 lbs | Smith machine with 25° decline board 3x10, 90 lbs | Smith machine with 25° decline board 3x10, 90 lbs | Smith machine with 25° decline board 3x10, 110 lbs |
| Step Downs (SD) & Heel Taps (HT) | | SD: 8" step x40 | SD: 8" step x40 | SD: 8" step x40; HT: 8" step x30 | SD: 8" step x50; HT: 8" step x40 | SD: 10" step x30; HT: 8" step x50 | SD: 10" step x30; HT: 8" step x50 | | | | |
| Supine Shuttle | | | 4 bands x50 | 4.5 bands x50 | 6 bands x75 | 8 bands x50 | | | | | |
| *Knee Extension Machine | | | | 3x10, 60 lbs | 3x10, 60 lbs | 3x10, 60 lbs | 3x10, 70 lbs | 4x10, 80 lbs | 3x10, 90 lbs | | |
| Hamstring Curl Machine | | | | | | | 3x10, 110 lbs | 3x10, 110 lbs | 4x10, 110 lbs | | |
| Lateral Resistor with Thera-Band | | | | Red, 4x20 yds | Red, 4x20 yds | Green, 2x20 yds | Green, 4x20 yds | Green, 4x20 yds | Blue, 4x20 yds | Blue, 6x20 yds | Black, 2x20 yds |
| Single Leg Stance | | | | | | bosu ball with rebounder, x40 | bosu ball with rebounder, x40 | bosu ball with rebounder, x40 | bosu ball with rebounder, x50 | bosu ball with rebounder, x75 | bosu ball with rebounder, x100 |
| *Leg Press | | | 5x10, 90 lbs | 4x10, 95 lbs | 4x10, 95 lbs | 4x10, 95 lbs | 4x10, 100 lbs | 4x10, 110 lbs | 4x10, 120 lbs | | |
| Ice to Patellar Tendon | | 10 min | 10 min | 10 min | 10 min | 10 min | 10 min | 10 min | 10 min | | |

*The patient performed the concentric quadriceps phase of the exercise utilizing both lower extremities and performed the eccentric quadriceps phase of the exercise using the right lower extremity only.

at which the maximum load is placed on the patellar tendon.³ At this point, the patient was told to place his left foot on the decline board and use both lower extremities to complete the ascending portion of the squat in order to return to the starting position. The patient was told to work through what he considered to be “moderate” pain, and the exercise was progressed when there was no pain felt in the patellar tendon during the exercise.^{9,10} As the patient was able to progress, the exercise was performed using the Smith machine in order to safely mimic some of the techniques used in Olympic-style weightlifting. Figure 1 depicts the decline squat being performed using the Smith machine.

In addition to the interventions listed in Table 2, the patient performed a twice daily home exercise program consisting of quadriceps stretches (2x30 sec) and ice as needed.

OUTCOMES

Over the course of the patient’s 6-week rehabilitation program, reported pain on a VAS, knee ROM measurements, and quad-

riceps MMT were recorded for each of the 11 visits. In addition, the patient completed the LEFS, Cincinnati, IKDC, and VISA at initial evaluation, on visit 6 and on visit 11. These measurements and scores are shown in Table 3 and Table 4. By the third visit, the patient’s right knee ROM had improved to that of the left knee and by visit 6, the patient was considered to have normal right quadriceps strength; while both improvements can be considered marginal, the patient’s initial deficits were minimal. More importantly, the patient was reporting no patellar tendon pain by visit 4. Improvements were also seen from initial evaluation to visit 6 and visit 6 to visit 11 in the LEFS, Cincinnati, IKDC and VISA. As stated earlier in the text, the Standard Error of Measure (SEM) for the LEFS, Cincinnati, IKDC, and VISA are +3.9, 10, 9 and 3 points, respectively.¹⁹⁻²² In considering the SEM for each of these functional scales, it is likely that changes in all 4 measures from initial evaluation to visit 6, as well as overall from initial evaluation to visit 11 can be considered improvements beyond measurement error. Addition-

ally, changes from visit 6 to visit 11 in the LEFS, IKDC, and VISA may also be improvements beyond error. While there was a 10-point improvement in the Cincinnati from visit 6 to visit 11, this may or may not be a change due to error. Scoring improvements noted in the LEFS, IKDC, VISA, and Cincinnati were across many constructs of function. The largest increases in scores for all questionnaires were seen from initial evaluation to visit 6. Because many of the constructs measured by these questionnaires considered pain’s effects on function, there may be an association between the patient’s score improvements and the fact that he was no longer reporting patellar tendon pain by visit 6. The patient’s largest score increases across the LEFS, Cincinnati, and IKDC questionnaires were seen in items pertaining to those activities the patient reported as his most painful at initial evaluation. These painful activities included squatting and stair ascending/descending. In addition the patient cited inability to perform higher functioning tasks such as, sport-related activities, and endurance activities secondary

to pain and weakness. Furthermore, over time as the patient's pain improved and no longer affected his ability to perform sport-related activities, the VISA voided the largest score improvements in heavily weighted scoring items pertaining to pain and time spent on sports training.

The patient was discharged following visit 11 because of his decreased pain symptoms, increased flexibility and strength, improvement in function, and independence in performing the exercises comprising his rehab program. Furthermore, he successfully met his rehabilitation goals set out in his initial evaluation. He was provided with verbal and written instruction in a home exercise program (HEP) comprised of knee stretching and strengthening exercises. Because the patient had access to a gym, many of the exercises in his HEP were those he had performed during his rehab program.

DISCUSSION

This case report describes the specific protocol used in the treatment of a competitive Olympic-style weightlifter presenting with signs and symptoms of patellar tendinosis. While the literature currently does not allude to a preferred treatment for patellar tendinosis, surgical treatment has not been demonstrated to be more effective than conservative treatment.³ The patient in this case report was able to demonstrate improvements in right knee ROM, right quadriceps strength, reported patellar tendon pain, and overall knee function following a conservative rehabilitation program consisting of stretching and strengthening of the right quadriceps and a progressive eccentric exercise program that was aimed at overloading the affected patellar tendon in order to encourage collagen synthesis and improve tensile strength of the tendon. While there are few studies evaluating eccentric training as a treatment for patellar tendinosis, the eccentric training program used during this patient's rehab reflected the positive results found in studies by Alfredson et al.^{9,10} They found that eccentric training was superior to concentric training in patients with patellar tendinosis. Furthermore the addition of a decline in performing eccentric squats showed superior results when compared with patients performing flat-step squats.

While diagnosis in cases such as these can be difficult to establish without imaging studies, we feel that this patient's diagnosis of patellar tendinosis was confirmed retrospectively. In treating the patient's impairments and primary complaints by follow-

Table 3. Impairment Outcome Measures

| | Initial Evaluation | Visit 6 | Discharge |
|----------------|--------------------|-----------|-----------|
| Pain: pre-tx | 8/10 | 0/10 | 0/10 |
| post-tx | 3/10 | 0/10 | 0/10 |
| ROM right knee | 10/0/140° | 10/0/145° | 10/0/145° |
| Quadriceps MMT | 4+/5 | 5/5 | 5/5 |

Table 4. Functional Questionnaire Outcome Measures

| | Initial Evaluation | Visit 6 | Discharge | Overall Change ‡ |
|---|--------------------|---------|-----------|------------------|
| Lower Extremity Functional Scale | 37/80 | 73/80 | 79/80 | 42* |
| Cincinnati Knee Rating System | 36/100 | 82/100 | 92/100 | 56* |
| International Knee Documentation Committee Subjective Knee Evaluation | 29.90% | 73.60% | 88.50% | 58.6%* |
| Victorian Institute of Sport Assessment Scale | 11/100 | 63/100 | 97/100 | 86* |

‡ Overall score change from initial evaluation to discharge

*Change larger than SEM

ing a progressive eccentric overload to the patellar tendon and closely monitoring the patient's symptom and functional improvements, we feel our initial hypothesis of degradation versus inflammation of the patellar tendon were supported by the successful outcomes.

Despite the promising results seen in this case and those reported in the literature in using eccentric training as a conservative treatment for patellar tendinosis, the variability in treatment protocols in the literature reflects the need for studies outlining an optimal protocol. Additionally, many of the referenced articles study young athletic populations and report the use of 12-week programs in which exercises are performed 7 days per week, twice daily.^{3,9,10} These programs require an extreme amount of dedication and time commitment that is not necessarily a plausible option for all patients suffering from this condition. The patient in this case report performed a 6-week program with eccentric training one time per day, 3 days per week with a stretching maintenance program to be performed at home daily. Even with the differences in frequency and duration of this patient's program versus those found in the literature, this patient

had equally successful results. Considering these points, there needs to be more randomized controlled trials with larger samples and more diverse subject populations, specifically studying the optimal frequency, duration, and time for an eccentric exercise training protocol in the treatment of patellar tendinosis. Additionally, there is very little quality research that has been published comparing outcomes following surgical versus conservative treatment for patellar tendinopathy. Open patellar tenotomy is the surgical treatment of choice as it is the most widely described. Other surgical options include: curettage of the patella at the tendon-bone junction, percutaneous longitudinal tenotomy, arthroscopic tenotomy and drilling of the inferior patellar pole.³ Further research comparing surgical to non-surgical treatment approaches are warranted in order to determine long-term outcomes.

To our knowledge, no studies describing the use of eccentric overload strengthening for the treatment of patellar tendinosis provide a detailed comprehensive intervention protocol. The literature supports the use of the eccentric decline squat as a single intervention for patellar tendinosis, but does not specifically describe any ad-

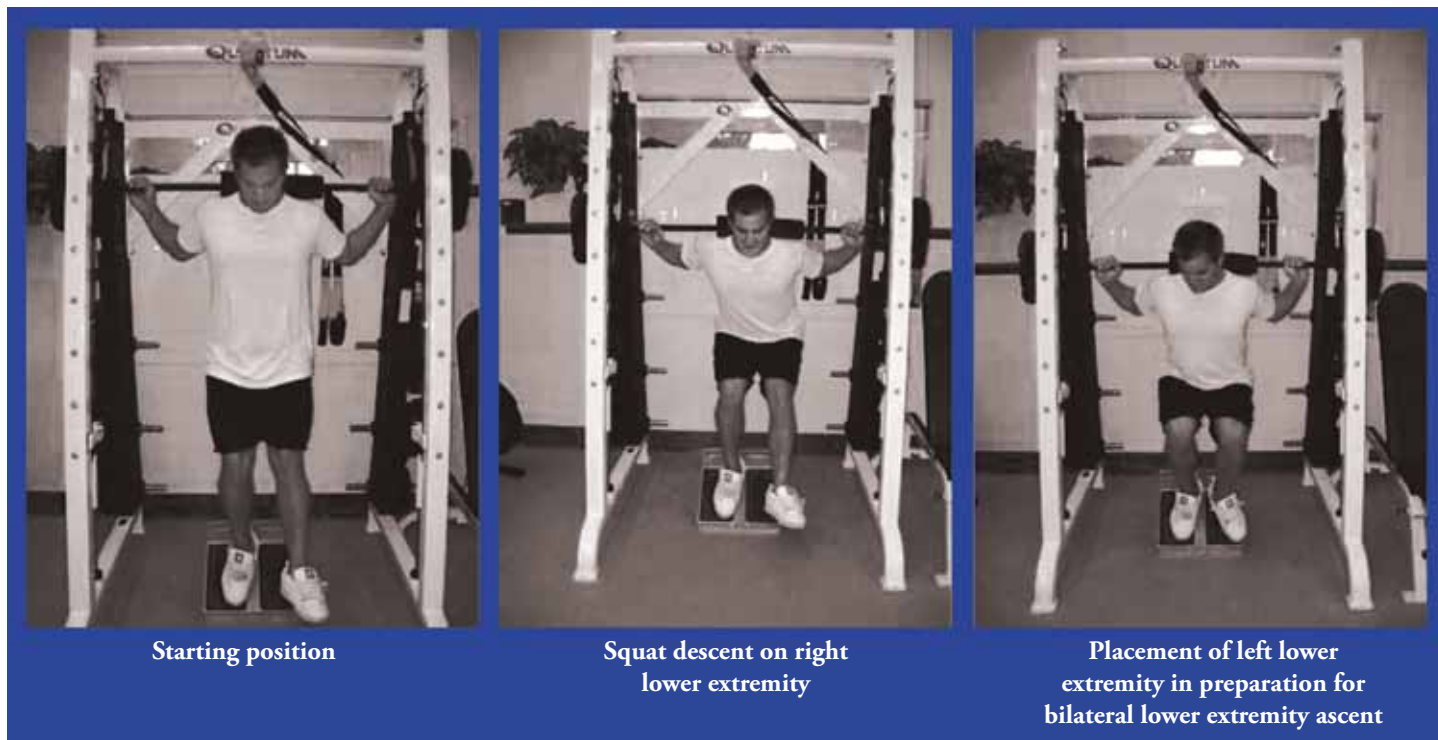


Figure 1. Eccentric Decline Squat Performed on the Smith Machine

ditional eccentric overload exercises as part of their treatment programs; therefore, it is likely our approach is novel. Our approach is more comprehensive than those we found in the literature since this patient was successfully treated with 3 eccentric overload exercises in addition to the eccentric decline squat. A strength of this case report is the detailed description of the prescribed interventions. We feel that this will lend well to reproducibility in undertaking such eccentric exercise protocols in the future. Furthermore, as patellar tendinopathies are often associated with jumping sports, few studies have examined this pathology in weightlifters. This study provides evidence of the use of eccentric overload exercise in the successful treatment of tendinopathy in an individual of an understudied population. Additional strengths of this case study are the use of knee specific questionnaires such as the IKDC and Cincinnati to monitor the patient's functional progress and a questionnaire specifically designed to monitor the severity of patellar tendinopathy as it relates to function, the VISA. There are a few limitations to consider when interpreting the results of this study. As with any case study, the authors are limited in their ability to establish a cause and effect relationship between our interventions and outcomes of interest. Another limitation to note is that no minimal clinically important differences (MCID) were reported for the questionnaires that were used in monitoring the

patient's functional outcome measures. We are therefore unable to make any judgments regarding the clinical significance of the changes in self-reported function following treatment based on MCID measures. We believe that, despite having no objective proof of a clinically important difference, this patient experienced clinically significant improvements due to his subjective reports that he was "back to normal."

This case report describes the use of a comprehensive eccentric overload training protocol in the treatment of an Olympic-style weightlifter with signs and symptoms of patellar tendinosis. The patient was able to report successful improvement in symptoms and function by using a similar, yet more comprehensive eccentric overload program than those found in the literature. While the interpretations able to be drawn from this case are limited, we believe it presents another potential option for the use of eccentric overload training in the treatment of patellar tendinosis and warrants consideration for further study.

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Varying Responses to Similar Physical Therapy Interventions for Cervical Radiculopathy: A Case Series

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ABSTRACT

Background and Purpose: A physical therapy program comprised of ergonomic intervention, cervical traction, and cervical mobilization is a common way to treat patients with cervical radiculopathy. The purpose of this case series is to describe the varying responses to this type of physical therapy program for 3 female patients with insidious onset of cervical radiculopathy. **Case Description:** A 69-year-old patient with insidious onset of neck and right shoulder pain radiating down the arm was treated with ergonomic intervention, postural strengthening, cervical traction, and mobilization to the cervical spine. A 48-year-old patient with insidious onset of neck and right hand pain, as well as a history of carpal tunnel syndrome, was treated with ergonomic intervention, postural strengthening, cervical traction, and mobilization to the cervical spine. A 34-year-old patient with chronic neck pain and stiffness, who previously had right upper extremity symptoms that resolved with surgery, came to physical therapy when her symptoms returned. She also reported depression, stress, and having to undergo cancer screening. She was treated with ergonomic intervention, postural strengthening, and cervical strengthening. **Outcomes:** The 69-year-old patient exhibited meaningful improvements in her Neck Disability Index (NDI) score and her Patient Specific Functional Scale (PSFS), an increase in cervical range of motion, and a decrease in her pain ratings. The 48-year-old patient exhibited more moderate functional improvement with clinically important improvements in her NDI and PSFS. The 34-year-old patient did not display any meaningful improvements or complete her course of therapy, possibly due to comorbidities. **Discussion:** A unique aspect of this case series was that all subjects were women receiving similar interventions for cervical radiculopathy, so a relevant risk

factor for poor outcome (being female) was consistent for each case. Despite this, varying responses to a tailored physical therapy intervention program were observed. In this case series, better outcomes seemed to be associated with better compliance to home exercise and fewer co-morbidities.

Key Words: ergonomic intervention, cervicalgia, neck pain, cervical radiculopathy, cervical mobilization

INTRODUCTION

Neck pain is the second largest cause of time off work and is one of the most common referrals to physical therapy from general practitioners.¹ When neck pain occurs concurrently with unilateral upper extremity pain, the possible pathology may be cervical radiculopathy. Physical therapy treatment for this particular diagnosis may be tailored according to a patient's presentation of signs and symptoms and commonly includes a plan of cervical traction, ergonomic intervention, and manual therapy. Reviews of the literature indicate that physical therapy may help cervical radiculopathy, but no randomized controlled trials are available to develop a distinct treatment plan;^{2,3} and there is no evidence that physical modalities, ergonomic intervention, or stress management programs are effective for treating nonspecific neck pain.⁴

Cervical radiculopathy has a reported prevalence rate of 3.3 per 1000 people and usually occurs during the fourth and fifth decades of life.³ The underlying pathology of this condition is irritation or compression of a nerve root in the cervical spine. Common causes of cervical radiculopathy include disc herniation or other space-occupying lesions⁵ although the underlying pathology cannot always be definitively identified. Signs and symptoms of cervical radiculopathy include neck pain; unilateral symptoms radiating down the arm; and

symptoms described as numbness, tingling, and/or shooting down the arm. A narrative review of cervical radiculopathy indicates that the natural course of this pathology is to spontaneously resolve within 5 years for 75% of patients.² Surgery to reduce nerve compression may improve pain and function but has significant risks such as anesthesia complications, blood clots, or infection.

Conservative interventions for cervical radiculopathy include ergonomic intervention, traction, and cervical mobilization. Ergonomic intervention may include workstation modifications and postural corrections with the aim being to correct a patient's posture during activities the patient participates in every day. A case report by Fabrizio⁶ showed that a patient with right upper extremity and neck pain had moderate outcomes after receiving physical therapy of manual soft tissue techniques, postural correction, and strengthening exercises. When ergonomic interventions were administered after that course of physical therapy, the patient's outcomes improved significantly with decreased pain intensity and higher scores in a rapid upper limb assessment and work style test.⁶ Traction may be used to relieve nerve root compression, either with manual cervical traction performed by the therapist or with a mechanical traction unit. Research concerning the efficacy of traction for neck pain remains controversial as it is not clear if it is more advantageous than other treatments.⁷ Mobilization to the cervical spine may be used to increase joint mobility. Appropriate cervical mobilization includes unilateral or central posterior-anterior (PA) glides or anterior-posterior (AP) glides. Randomized controlled trials have demonstrated that specific cervical mobilization and thrust manipulations decrease pain and improve range of motion in patients with mechanical neck pain in comparison to control mobilization procedures.^{8,9} No such

studies, however, currently provide evidence for the effects of cervical mobilization and manipulation in patients with cervical radiculopathy.

Currently, there is a fair amount of evidence to guide treatment of neck pain without radicular symptoms.^{1,4,10} In contrast, current evidence does not support a standardized intervention to effectively treat cervical radiculopathy. The clinical practice guidelines established by the Orthopaedic Section of the American Physical Therapy Association recommend intermittent cervical traction and nerve mobilization procedures for patients with neck and arm pain, but made these recommendations based on moderate evidence.¹⁰ No other recommendations for a complete plan of care is mentioned. As a result, treatment protocols must be adjusted for each patient based on their clinical presentation, for example, decreased range of motion treated with cervical mobilization. Additionally, physical therapists (PTs) may need to combine interventions to optimize outcomes for their patients with cervical radiculopathy. The purpose of this case series is to describe the outcomes resulting from a physical therapy program tailored to the symptoms and impairments of 3 patients with a diagnosis of cervical radiculopathy.

CASE DESCRIPTION

Three female patients (1,2,3) were referred to a Brooks Rehabilitation outpatient clinic with a diagnosis of cervical radiculopathy. Their information will be presented separately throughout this case series.

History & Demographics

Patient 1

A 69-year-old female patient with insidious onset of right neck and shoulder pain radiating down the right arm proximal to the elbow was referred by her doctor for physical therapy. The patient had not received any diagnostic imaging at the time of her physical therapy examination and she reported no relevant co-morbidities. Her pain was described as dull, achy, sharp, and stabbing. Intensity was rated as a 10/10 (highest intensity) and 5/10 (lowest intensity). Aggravating factors included activity and lying on her right side to sleep while relieving factors included rest and heat. This patient also complained of muscle dysfunction leading to difficulties with driving, lifting objects such as garbage and groceries, sleeping, and performing computer work. Before present symptoms, this patient was

retired and able to perform all activities of daily living independently. The patient's goals for therapy were to resume bicycle riding and to go to her fitness center.

Patient 2

A 48-year-old female patient with insidious onset of bilateral neck and right hand pain that had increased over the previous 2 months was referred by her doctor for physical therapy. The patient had received diagnostic imaging showing moderate neural foraminal narrowing at C4-5, C5-6 as well as degenerative changes. She reported a history of carpal tunnel syndrome. Her neck pain was described as achy, sore, and constant while her right hand pain was described as sharp, burning, tingling, and numb. Intensity was rated as a 6/10 (highest intensity) and 3/10 (lowest intensity). Aggravating factors included activity and the patient was unable to identify any relieving factors. The patient described difficulty writing, holding objects, opening jars, driving, and typing. Before present symptoms, this patient was working as a security guard at a gated community and able to perform all activities of daily living and job tasks independently. The patient's goals for therapy were to write without limitation and perform job tasks.

Patient 3

A 34-year-old female patient with chronic bilateral neck pain and stiffness was referred by her doctor for physical therapy. Diagnostic imaging showed a cervical fusion at C5-6 with surgery dated as 6 months prior to onset of therapy. Co-morbidities included a surgery consisting of an anterior cervical discectomy and fusion C5-6 and multiple psychosocial factors. These psychosocial factors included a recent move from Idaho, being a single mom working 2 jobs, and a history of depression. In addition, the patient was being screened for thyroid cancer and was coping with the recent death of a family member. Her pain was described as achy, burning, and stiff; and intensity was rated as a 7/10 (highest intensity) and 2/10 (lowest intensity). Pain was identified to be the worst in the evening after doing computer work all day. Relieving factors included medication, previous physical therapy, and change of position. The patient described difficulty with work duties and computer work. Before present symptoms, she was working as both a nail technician and as a fraud specialist; she was independent with ADLs. Both jobs required her to compromise her posture on a daily basis.

Her level of function immediately after surgery 6 months ago included continued difficulty with work duties and computer work but with resolution of right upper extremity symptoms. The right upper extremity symptoms have since returned and increased over the last 2 weeks. The patient's goals for therapy were to work on her posture, return to physical activity, lose weight through increased activity, stop complaints of pain, and discontinue her pain medications.

EXAMINATION

Each patient was examined for cervical range of motion (ROM), cervical strength, posture, reflex activity, shoulder ROM, joint mobility, and special tests. Specific cervical ROM measurement methods are detailed in the tests and measures section below. Cervical strength was assessed with manual muscle testing. Upper extremity reflex activity was assessed for C5-7 myotomes with a reflex hammer, and shoulder ROM was measured with either observation or with a goniometer. Joint mobility was assessed with cervical PA glides in prone and unilateral PA glides in sitting. Special tests included the Vertebral Artery Test and the Alar Ligament Test that were used to assess appropriateness of cervical manipulation. The entire examination is not reproduced in this article for the sake of brevity. Only relevant factors for confirming the diagnosis of cervical radiculopathy and determining the treatment plan are reported below.

Patient 1

She reported pain on the right side of her neck with cervical rotation bilaterally and with sidebending to the left. Cervical strength for flexion/extension/sidebending/rotation were all 4/5 or greater. She demonstrated hyporeflexia with right biceps tendon testing in comparison to the left. Posture was observed as rounded shoulders, slight kyphosis, and a left head tilt at rest. Pain in her right shoulder was reported when that upper extremity was abducted or flexed >90° and with elbow flexion muscle testing.

Patient 2

She reported pain with sidebending to the right. Cervical strength was limited with a 2+/5 for flexion and 3/5 for extension. Joint hypomobility was observed bilaterally at C4-6. Posture was observed as forward head posture and slightly rounded shoulders. During palpation, increased

muscle turgor in the bilateral upper trapezius muscles, levator scapulae, and cervical paraspinals was noted.

Patient 3

She was observed to have decreased cervical rotation to the right, sidebending to the right, and extension. She also demonstrated weakness with cervical sidebending to the left 4/5 and cervical rotation to the left 4/5 when all other cervical movements were rated as 5/5. The patient reported pressure in the sinus area with supine cervical extension that increased with rotation during the administration of the vertebral artery test. Posture was observed as rounded shoulders and forward head.

TESTS AND MEASURES

Each patient completed standard baseline testing, which consisted of the following:

Pain Intensity: This scale was used for patients to rate their pain on a 0-10 scale with 0 = no pain at all and 10 = the worst pain imaginable. For the baseline rating of pain, the Visual Analog Scale (VAS) was used, a 10 cm line where the patient would mark their worst pain, their best pain, and their current pain. The VAS has been used extensively as an outcome measure and has demonstrated good reliability and validity; and therefore is generally accepted by the scientific community.⁵ For follow-up visits, the Numeric Rating Scale (NRS) was used where patients were asked to identify the level of their current pain intensity on a 0-10 scale with 0 = no pain at all and 10 = the worst pain imaginable. While the validity of this measure has not been reported in patients with cervical radiculopathy, there have been studies on its validity in patients with mechanical neck pain. The NRS demonstrated moderate test-retest reliability with an intra-class coefficient (ICC) of 0.76 and a 95% confidence interval of 0.51-0.87. The minimally clinically important difference (MCID) was 1.3 points.¹¹

Neck Disability Index (NDI): This self-report was designed for patients with a generalized diagnosis of neck pain. It contains 7 items related to ADLs, 2 items related to pain, and 1 item related to concentration. Each item is rated from 0 to 5 with 0 = no difficulty and 5 = unable or extreme difficulty. The total score is expressed as a percentage with higher percentages representing greater disability. In patients with cervical radiculopathy, the test-retest reliability has been found to be fair to moderate with an



ICC of 0.68 and a 95% CI of 0.3-0.9. It is not as responsive to change as other measures such as the Patient Specific Functional Scale with a minimally detectable change of 10.2 and an MCID of 7.0.¹² The Orthopaedic Section recommends the use of the NDI for patients with neck pain to determine their baseline level of functioning and to monitor improvement over the course of treatment (based on strong evidence).¹⁰

Functional Limitation Measure: This self-report is used by Brooks Rehabilitation as a measure of what percentage of the day a patient is experiencing limitation due to their condition. The patient was specifically asked "How often is your condition affecting your daily life?" There are no reliability or validity studies available on this idiosyncratic, self-report measure.

Patient Specific Functional Scale (PSFS): This test was designed to quantify activity limitation and measure functional outcomes in patients with any orthopaedic condition. The scale asks the subject to think of at least 3 important activities that they are unable to do or having difficulty with because of their condition. The patients then score their ability with a 0 = unable to perform activity and 10 = able to perform activity at the same level as before injury/condition. When using the PSFS with patients that have cervical radiculopathy, it demonstrates superior reliability, construct validity, and responsiveness compared to the NDI. The PSFS has high test-retest reliability with an ICC of 0.82 and a 95% CI of 0.54-0.93. Its minimally detectable change is 2.1 and its MCID is 2.0.¹² The Orthopaedic Section recommends the use of the PSFS for patients with neck pain to determine their baseline level of functioning and to monitor improvement over the course of treatment (based on strong evidence).¹⁰

Cervical Range of Motion: These measurements were performed by a PT and a student physical therapist (SPT). Before measurement, the patient was seated in a chair and asked to assume a neutral neck position and the best posture possible. If the PT was the primary examiner, she would ask the patient to perform flexion, extension, sidebending bilaterally, and rotation bilaterally.

The PT would then record a percentage of normal cervical ROM that the patient was able to attain. If the SPT was the primary examiner, she would ask the patient to perform the same movements but used an inclinometer to measure flexion, extension, and sidebending bilaterally and used a goniometer to measure rotation bilaterally. Reliability coefficients for cervical spine ROM parameters range from 0.81 to 0.84 (ICC=2.1).⁵

PROGNOSIS

The prognosis was determined for each patient, taking into account prior risk factors from the literature, relevant co-morbidities, examination findings, and the patient's expressed attitude towards therapy. Risk factors detailed in the literature for general neck pain include female gender, headaches, and psychological distress.¹³ Systematic reviews of the literature also have found psychological health, coping patterns, and the need to socialize to be the strongest prognostic factors for neck pain.¹⁴

Patient 1

Prognosis was determined to be excellent based on her lack of co-morbidities and her level of activity prior to onset of symptoms. In addition, her cervical strength was good and the patient was able to identify several relieving postural factors, both of which were believed to be indicators of a favorable outcome.

Patient 2

Prognosis was determined to be good based on the presence of co-morbidities and her occupation. She had a previous diagnosis of carpal tunnel syndrome and worked as a security guard that required her to write throughout her 8-hour shift. The patient's pain levels were moderate but she rated her disability due to pain as affecting her 80% of the day. In addition, her cervical and grip strength were poor, and we believed these to be indicators that an optimal outcome was not expected.

Patient 3

Prognosis was determined to be only fair after her initial evaluation. This patient

underwent an anterior cervical discectomy and fusion C5-6 six months prior to onset of physical therapy treatment. Strength was good for all cervical movements except side-bending and rotation to the right. However, the patient described experiencing cervicogenic headaches several times per day and dizziness when using quick neck movements. These are typically indicators of poor outcome in patients with cervical pain.¹³

INTERVENTION

Physical therapy was provided on site at a Brooks Rehabilitation outpatient clinic. Therapy was provided in one hour time blocks with one therapist working with 2 patients each hour. Rehabilitation technicians were available to guide interventions but only if the therapist had already performed the primary instruction. All subjective information was acquired and documented by the therapist. All 3 patients were treated with similar intervention plans to address pain, loss of function, and muscle dysfunction. (Refer to Table 1 for patient specific intervention information.)

Manual Traction: The manual cervical traction was performed with the patient in supine. A towel was rolled and placed posterior to the occiput. The therapist would lower the hi-lo examination table to get an approximate 45° angle of pull while the therapist applied a superior anterior distraction force. Traction was held for 3 bouts of 1 minute each session.

Postural Strengthening: Patients completed a postural strengthening program targeting the middle trapezius and rhomboid muscles. Patients were first taught to do scapular retractions standing against a half foam roll on the wall. They were instructed to “squeeze the shoulder blades together around either side of the half foam roll.” Scapular retractions were later progressed to be performed in standing with yellow Thera-Band providing the resistance with elbows bending to 90°. Shoulder extensions were performed in standing with yellow Thera-Band providing resistance with elbows extended. Chin tucks were performed in supine. Patients were instructed to retract their chins posteriorly and told not to flex their necks. Palpation was used to determine if the patients were incorrectly activating the sternocleidomastoid. The yes/no/maybe exercise consisted of the patient sitting upright in a straight-backed chair with the assumption of the best posture possible. The patients were then instructed to slowly nod their heads in a small range of motion

followed by turning their heads side to side slowly and in a small range of motion. Finally the patients would shrug their shoulders and then release into a relaxed posture. All patients were given a written home exercise program for each exercise included in the postural strengthening program.

Postural Education: General postural education was provided to each patient, including positioning for sleeping, sitting, and standing. For sleeping, patients were instructed to use a pillow that would put their necks in an optimal neutral position. They were told that sleeping in supine or on



Figure 1. Principles used for computer and workstation set-up for good body mechanics and posture.

their side would be best. For sitting, patients were instructed to keep their shoulders back and necks in a neutral position. This positioning education was supplemented with the previously described postural strengthening exercises. For standing, patients were instructed to avoid twisting and using rapid movements. They were also told to keep their shoulders back and their necks in a neutral position.

Ergonomic Intervention: Principles used to assess and optimize both computer station set-up and workstation set-up can be viewed in Figure 1. Patients were given handouts with diagrams for good posture at either a computer station or work station and were given cues to remember their posture while working at that station. Examples of cues include remembering to adjust posture every hour or every time they took a bathroom break.

Soft Tissue Massage/Myofascial Release: Soft tissue massage (STM) and myofascial release techniques were used in the

right upper trapezius and bicep muscles in Patient 1. Similar techniques were used on the right upper trapezius muscle and bilateral rhomboid muscles in Patient 2. Similar techniques were also used in the bilateral upper trapezius, middle trapezius, and rhomboid muscles in Patient 3.

Cervical Mobilization: Mobilization with movement was performed with the patient in sitting and the therapist palpating for the cervical spinal segment while instructing the patient to rotate their head simultaneously. Grades I-III oscillations were used according to patient pain and mobility to increase cervical rotation. Anterior-posterior glides were applied with the patient in supine and the therapist's fingers oscillating at the cervical transverse processes unilaterally. Central PA glides were applied with the patient in prone and the therapist's fingers oscillating at the cervical spinous processes.

Cervical Strengthening: High repetition and low resistance were used to improve endurance in Patient 3. She performed bilateral cervical sidebending exercises against gravity; 2 sets of 10 each side. She also performed cervical flexion, extension, and bilateral rotation exercises using pulleys for resistance; 1 set of 10 at 2.5 pounds each direction.

OUTCOMES

Patient 1

She was treated for 8 physical therapy sessions consisting of ergonomic intervention, postural strengthening, manual cervical traction, and mobilizations to the cervical spine C4-6 for rotation to the left (Table 1). She reported good compliance with her home exercise program (HEP) and did not miss any physical therapy treatment sessions. Her outcomes are reported in Table 2a.

She appeared to have excellent functional outcomes. Her NDI improved 24% over the course of treatment exceeding the MCID of 7.0%. This patient's PSFS improved 29 points also exceeding the MCID of 2.0 points. This large increase shows that the patient was likely to have improved with completion of self-selected activities that previously impeded her.

The patient reported a meaningful decrease in her perceived functional limitation, as well as in her pain intensity that declined 5 points, exceeding the MCID of 1.3 points. Her cervical rotation to the left increased 7°, to approximately the same degree as her rotation to the right, with the same tester taking all 3 sets of measurements. The high test-retest reliability of this

Table 1. Interventions used during Physical Therapy Treatment of Cervical Radiculopathy

| | | Patient 1 | Patient 2 | Patient 3 |
|------------------------------|--|-----------|-----------|-----------|
| Manual therapy: | Cervical traction | √ | √ | |
| | Suboccipital release | √ | √ | √ |
| Postural Strengthening: | Scapular retractions | √ | √ | √ |
| | Shoulder extensions | √ | √ | √ |
| | Chin Tucks | √ | √ | √ |
| | Yes/No/Maybe | √ | √ | √ |
| Postural Education (general) | | √ | √ | √ |
| Ergonomic Intervention: | Computer set-up | √ | | |
| | Workstation set-up | | √ | √ |
| Adjustment of walking sticks | | √ | | |
| STM/MFR | | √ | √ | √ |
| Cervical mobilizations: | MWM for cervical rotation | √ | √ | |
| | Grade I AP glides in the cervical spine | | √ | |
| | Grades I and II CPA through cervical spine | | √ | |
| Cervical strengthening | At pulleys and vs. gravity | | | √ |

| | |
|--------------|--|
| STM | Soft tissue massage |
| MFR | Myofascial release |
| MWM | Mobilizations with movement |
| AP | Anterior-posterior |
| CPA | Central posterior-anterior |
| Yes/No/Maybe | Exercise used to increase cervical range of motion |

measure means the patient likely had ROM improvement.

Patient 2

She was treated for 15 physical therapy sessions consisting of ergonomic intervention, postural strengthening, manual cervical traction, and mobilizations to the cervical spine C4-6 for rotation bilaterally and flexion/extension (Table 1). She reported good compliance with her HEP and only missed one PT treatment session over the

course of 2 months. Her outcomes are reported in Table 2b.

She appeared to have good functional outcomes. Her NDI improved 16% over the course of treatment exceeding the MCID of 7.0%. This patient's PSFS improved 19 points also exceeding the MCID of 2.0 points. This large increase shows that the patient was likely to have improved with completion of self-selected activities that previously impeded her.

The patient reported a large decrease in

perceived functional limitation. She also reported a moderate decrease in pain intensity of 2 points, just exceeding the MCID of 1.3 points. Therapist documentation of cervical ROM percentages indicated improvement but these percentages were not measured, being based only on visual estimates.

Patient 3

She was seen for 8 physical therapy sessions consisting of ergonomic intervention, postural strengthening, cervical strengthening, and STM to the right upper trapezius and rhomboid muscles (Table 1). Patient 3 reported fair compliance with her HEP but discontinued therapy prior to her discharge. Her outcomes are reported in Table 2c.

This patient appeared to have poor outcomes. Her NDI improved 6% over the course of her treatment, failing to meet the MCID of 7.0%. This patient's PSFS remained the same. This test is very sensitive with an MCID of 2.0 points and so we can assume that the PSFS remaining the same indicates that she had no functional improvements from therapy.

The patient's pain intensity increased over the course of treatment. Perceived functional limitation remained the same and cervical ROM measures were not able to be compared to monitor progress.

DISCUSSION

In 3 patients with cervical radiculopathy, a symptom and impairment based physical therapy intervention program seemed to help patients regain function and decrease pain provided that the patient did not have a large amount of co-morbidities. A unique aspect of this case series was that all subjects were women receiving similar interventions. This meant that a consistent risk factor for poor outcome (being female) was present in all 3 of these cases. Therefore, we were able to see what impact co-morbidities may have on patient outcomes after being treated with a multimodal physical therapy intervention program for cervical radiculopathy.

Neck pain can be affected by much more than just an intervention or the primary cause of pathology. Neck pain may be highly related to psychosocial factors in some patients, especially in the creation of a chronic condition.¹⁰ The strongest prognostic factors found to be related to nonspecific neck pain include being female¹³ and psychological distress.¹⁴

Occupational factors can also influence nonspecific neck pain, especially when related to workstation set-up and job require-

Table 2a. Patient 1 Outcomes

| | Initial | Midway | Final |
|--------------------------------------|-------------------|-------------------|---------------------------------------|
| Pain Intensity | 5/10 | 3/10 | 0/10 |
| NDI | 38% | 26% | 14% |
| Functional Limitation Measure | 50% | 10% | 0% |
| PSFS (out of 40 max) | 11 | 26 | 40 |
| Cervical ROM | 58° rotation left | 63° rotation left | 65° rotation left, 66° rotation right |

Table 2b. Patient 2 Outcomes

| | Initial | Midway | Final |
|--------------------------------------|--|--|---|
| Pain Intensity | 4/10 | 3/10 | 2/10 |
| NDI | 30% | 28% | 14% |
| Functional Limitation Measure | 80% | 50% | 20% |
| PSFS (out of 60 max) | 17 | 28 | 36 |
| Cervical ROM | 75% rotation left, 60% rotation right, 50% left sidebending, 25% right sidebending, 75% flexion, 50% extension | 80% rotation left, 70% rotation right, 60% bilateral sidebending, 80% flexion, 65% extension | 100% rotation left, 80% rotation right, 100% left sidebending, 75% right sidebending, 100% flexion, 80% extension |

Table 2c. Patient 3 Outcomes

| | Initial | Midway | Final |
|--------------------------------------|---------|--------|------------------|
| Pain Intensity | 7/10 | 8/10 | Unable to assess |
| NDI | 26% | 20% | Unable to assess |
| Functional Limitation Measure | 80% | 80% | Unable to assess |
| PSFS (out of 30 max) | 23 | 23 | Unable to assess |

ments. Aside from ergonomic intervention given by physical therapists, other effective intervention options are health promotion programs and postural programs in the workplace. Many factors beyond the health care system impact the person with or at risk for neck pain.⁴

In this case series, it seems that despite having patients of the same gender with similar symptoms and impairments and using relatively similar interventions, the patients exhibited different outcomes. Since all patients were female, this observation seems to be most related to the perceived compliance and the incidence of co-morbidities in this

selected population. Therapy may be most effective in patients like Patient 1 who had good compliance and a low incidence of co-morbidities. In patients like Patient 3, psychosocial factors and poor compliance with her HEP may have contributed to poor outcomes. Increased age, which can also be a risk factor for poor outcome,¹⁴ did not appear to have a strong influence for these patients as the oldest patient had the best outcome (Patient 1).

A limitation to this case series included the lack of reliability and validity for the Functional Limitation Measure used by Brooks Rehabilitation. While it is a quick

and easy way to gain perspective on how the patient feels their condition is affecting their daily life, there is no evidence supporting its use in patients with cervical radiculopathy. Another limitation was the lack of standardized assessment in cervical ROM measurements when performed by the PT (percentages) versus the SPT (goniometric measurements). The measurement of a patient's cervical ROM should have been standardized at the outset of the study. Measurements using an inclinometer and goniometer would be preferred considering they have higher intra- and interreliability than the use of percentages.

Another limitation involving standardized assessment was the use of both the VAS and the NRS. If this study was repeated, we would be sure to use just one scale to measure pain intensity throughout the entire course of treatment. A final limitation would be that there was no standardized measurement for psychological factors. Although we suspected psychological influence in these patients, the use of an appropriate questionnaire, like the Fear-Avoidance Beliefs Questionnaire (FABQ), could have qualitatively assessed the risk for psychological factors since psychological distress is known to negatively impact neck pain outcomes.¹³

Treatment of cervical radiculopathy is complex and several different options are available such as exercise therapy, spinal manipulation, and ergonomic intervention. We believe that the treatment provided to the patients in this case series was effective and based on the best evidence available. If we were doing the study again, we would control for differences between assessors (ROM measurements) and qualitative assessments (pain intensity). We would also have administered an FABQ to each patient to assess the role of pain-related fear and avoidance beliefs.

It is clear from a review of the literature and the results of this case series that future research on interventions for cervical radiculopathy is indicated. Neck pain is a complex issue for researchers and clinicians alike. The current clinical guidelines primarily target mechanical neck pain and nonspecific neck pain; and it is our belief that cervical radiculopathy is a common enough disorder to necessitate more research. To optimize outcomes, a standardized method of treatment for patients with a diagnosis of cervical radiculopathy needs to be studied. We would suggest a randomized controlled trial on a large scale studying patients with cervical radiculopathy being treated with cervical traction, as the evidence to support this intervention is still undetermined.¹⁰ We also encourage further study using a randomized controlled trial for cervical mobilization in patients with cervical radiculopathy as current research has only addressed this intervention in patients with mechanical neck pain.

Clinicians also need to be aware that when making prognoses for patients with cervical radiculopathy, psychosocial factors and occupational factors will impact a patient's progress and outcomes. Screening of potential patients should include the use of

a psychological measure such as the FABQ, consideration of pertinent co-morbidities (such as presence of headache), and a workplace evaluation. There is a large amount of evidence available concerning the prognostic factors for neck pain, but very little for cervical radiculopathy. A study similar to our case series but incorporating an FABQ and controlling for gender and other prognostic factors such as psychological distress and headache¹³ could be used to develop guidelines for addressing psychosocial issues concurrently with functional deficits.

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The Assessment and Inclusion of Balance Training in the Rehabilitation of an Elderly Man with Symptomatic Bilateral Knee Osteoarthritis

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ABSTRACT

Background and Purpose: Osteoarthritis (OA) is the most common disease of the musculoskeletal system. Impairments such as decreased strength and range of motion accompany OA. Additionally, a loss of both joint position sense and balance may also be associated with OA of the lower extremity. While very comfortable in the appraisal of impairments such as strength and range of motion, physical therapists working in an orthopaedic setting may not be as well versed in the assessment of balance. The purpose of this case study is to describe the assessment of balance and addition of balance exercises to a rehabilitation program in an individual with symptomatic bilateral knee OA.

Case Description: Mr A was an 81-year-old male diagnosed with bilateral knee osteoarthritis. He had a history of knee pain that had recently increased in the past 3 months. In addition to strength, range of motion limitations, and functional limitations, he presented with decreased balance as assessed by the Berg Balance Scale (BBS) and the Dynamic Gait Index (DGI). **Intervention:** Treatment focused on balance and therapeutic strengthening exercises. Limitations identified by the BBS and DGI directed interventions for noted balance deficits. **Outcomes:** Mr A's BBS and DGI scores had a meaningful change showing an improvement in balance. Additionally, a meaningful improvement was observed in the Lower Extremity Functional Scale (LEFS) suggesting improved function. Interestingly, a clinically meaningful change in pain was not observed during the course of treatment. **Discussion:** The additional component of balance training to the rehabilitation program for an individual presenting with bilateral knee OA was directed by validated measures of balance and associated with meaningful improvement in BBS, DGI, and LEFS scores.

Key Words: knee pain, physical therapy, functional outcome

INTRODUCTION

Osteoarthritis (OA) is the most common disease of the musculoskeletal system and is associated with disability within the elderly population.^{1,2} By age 65, OA is present in 30% of the population and 40% of these people will be symptomatic.³ Osteoarthritis can be an extremely disabling condition and is the number one reason for lower extremity joint arthroplasty.^{1,2} Treatment for OA can be very costly and may be a key factor in socioeconomic problems.¹

Osteoarthritis of the knee is related to disability, pain, stiffness, and decreased production of quadriceps force.^{3,4} Specifically, these impairments correspond to functional difficulties in prolonged sitting, squatting, kneeling, and transferring in and out of a car.⁵ Additionally, knee OA is associated with deficits in proprioception,^{6,7} balance,^{8,9} and an increased risk of falls.^{10,11} In addition, knee joint instability is a common finding in 63% of patients with knee OA, and of these, 44% complain of instability affecting their mobility.⁴ Furthermore, loss in proprioception has been associated with functional deficits such as change in walking rhythm, decreased step length, slow walking speed, and total walking time.¹

Traditional treatment for knee OA focuses on impairments such as strength, endurance, and flexibility training; however, consideration of balance deficits may not be prioritized. Additionally, physical therapists working in an orthopaedic setting may not be as familiar with validated measures of balance as those working in other areas such as a geriatric setting or a neurorehabilitation setting. Failure to adequately address balance deficits may be a significant oversight as the inclusion of balance training in rehabilitation protocols for the treatment of knee OA may improve their effectiveness.⁴

The purpose of this case study is to describe the assessment and addition of balance exercises to a rehabilitation program in a patient referred to physical therapy with symptomatic bilateral knee OA.

CASE DESCRIPTION

Mr A is an 81-year-old male who presented with bilateral knee pain that had increased insidiously over the last 3 months. He reported over 8 years of knee pain of insidious onset prior to the current exacerbation. Mr A saw his physician who sent him for an MRI and x-ray, which per self-report, confirmed degenerative changes in both knees.

Mr A's primary complaints were of aching pain, morning stiffness, and occasional "giving out" of both knees. He reported pain on the medial side of both knees that was worse following prolonged standing. Mr A's pain was rated on the 11-point numerical pain rating scale (NPRS), with 0 indicating no pain and 10 representing the worst pain imaginable. Reliability and validity of the NPRS have not been investigated for patients with knee OA, but the reliability for patients with low back pain is found to be 0.61 and the criterion validity is 0.96 for younger and older surgical patients.^{12,13} He reported his pain over the past 2 days to be at worst: 9/10, currently: 8/10, and at best: 6/10 (Table 1). Giving out of the knees occurred approximately 2 times a week and occurred primarily towards the end of the day and following prolonged standing or walking. Mr A reported taking Mobic and Tylenol for pain relief. Past medical history was significant for restless leg syndrome and bilateral shoulder pain. He reported previously undergoing physical therapy for his shoulder pain and felt this to be helpful. He stated he had no prior therapy to address his knee pain.

Functionally, Mr A reported spending the majority of his time on the computer

and occasionally performing light duties around the house. He reported ambulating without a cane for household distances, but started using a single point cane about 2 months prior to beginning rehabilitation for community ambulation secondary to unsteadiness of gait. Mr A also mentioned that he fell once within the last year, and attributed it to the morning stiffness within the knees. Mr A stated his primary goals for physical therapy were to decrease his knee pain and improve the stability of his legs.

Examination

Mr A stood with a forward flexed posture and walked without an assistive device displaying a slow paced antalgic gait. Range of motion (ROM) of the knee was assessed in supine with a goniometer. Right knee active ROM ranged from 0/2-130° and left knee AROM was 0/3-122° (Table 1). Patella hypomobility was observed with superior and inferior glides. Strength was grossly 3+ to 4-/5 and was assessed by administration of an isometric break test in the seated position with the knee positioned at 60° to 70° of knee flexion, as Mr A reported discomfort with changing into various positions (Table 1).

Function was assessed through the Lower Extremity Functional Scale (LEFS).

The LEFS is a 20-item questionnaire for individuals with musculoskeletal injuries of the lower extremity and is based on a 0-4 numerical scale with higher scores representing better function. The LEFS has not been validated in patients with knee OA, but has demonstrated high reliability (ICC = 0.92, CI = 95%) and correlates highly ($r = 0.78$) with the Western Ontario and McMaster Universities Osteoarthritis Index in individuals with hip OA.¹⁴ Mr A scored 12/80 points on evaluation day, indicating extreme difficulty with most lower extremity function¹⁴ (Table 2).

Due to Mr A's self report of a history of a fall, unsteadiness, and the recent need for an assistive device during community ambulation, the decision was made to formally evaluate his balance. The Dynamic Gait Index (DGI) and Berg Balance Scale (BBS) were administered during the evaluation to assess balance. The DGI assesses functional stability and risk for falls of older people during gait and is based on a 4-point scale ranging from 0 (severe impairment) to 3 (normal ability).¹⁵ Scores of 19 or less have been related to increased incidence of falls in the elderly¹⁵ and Mr A scored a 13 (Table 2). While the psychometric properties of the DGI have not been studied in individuals with OA, the DGI has demonstrated

good reliability (ICC=0.96) and moderate validity ($r = 0.68-0.83$) related to individuals with stroke.¹⁵

The BB is a 14-point scale designed to measure balance of elderly patients in the clinical setting and is scored on a numerical scale that ranges from 0 (cannot perform) to 4 (normal performance) for each item.¹⁶ At evaluation Mr A scored a 26/56 (Table 2) on the BBS, indicating a medium risk for falls.¹⁶ The BBS has shown moderate concurrent validity ($r = 0.71$) with the DGI in individuals with vestibular dysfunction and a high reliability of ICC = 0.97 in the geriatric population.^{16,17}

EVALUATION

Diagnosis

Mr A is an 81-year-old male referred to physical therapy with a medical diagnosis of bilateral knee OA. Significant findings on the physical therapy examination included decreased function, pain, decreased ROM, and decreased strength. Additionally, balance deficits were identified on the DGI and BBS.

Prognosis

Prognosis was somewhat guarded as Mr A has shown persistent symptoms of OA for a number of years. However, rehabilitation



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Table 1. Changes in Impairments Observed During the Course of Rehabilitation

| | Evaluation | | Discharge | |
|-----------------------------|--|---------|--|---------|
| | Right | Left | Right | Left |
| Strength | | | | |
| Knee flexion | 4-/5 | 4-/5 | 5/5 | 5/5 |
| Knee extension | 4-/5 | 3+/5 | 4+/5 | 4+/5 |
| Hip flexion | 4-/5 | 4-/5 | 5-/5 | 5-/5 |
| Hip abduction | 3+/5 | 3+/5 | 4+/5 | 4+/5 |
| Hip adduction | 3+/5 | 3+/5 | 4/5 | 4/5 |
| Ankle dorsiflexion | 3+/5 | 3+/5 | 4+/5 | 4+/5 |
| Ankle plantarflexion | 4-/5 | 4-/5 | 4+/5 | 4+/5 |
| Range of Motion | | | | |
| Active knee range of motion | 0/2-130 | 0/3-122 | 0/2-130 | 0/3-122 |
| Pain | | | | |
| | Worst= 9/10 Current=8/10 Best=6/10 Average= 7.7 | | Worst= 8/10 Current=6/10 Best=5/10 Average= 6.3 | |

Key: Changes in impairments of strength, range of motion, and pain observed during the course of rehabilitation. Pain was assessed with a numeric rating scale anchored with 0= no pain at all and 10= worst pain imaginable. Average pain indicates the average of worst, current, and best pain rating for a given session.

exercises were expected to improve measures of muscle strength, pain, and function.^{2,3} Mr A appeared appropriate for a trial of physical therapy with the intention of decreasing pain and increasing range of motion, strength, balance, and function.

INTERVENTION

Mr A was treated with stretching, strengthening, and balance exercises. The Nu Step recumbent cross trainer was included at the beginning of each treatment to help warm up the muscle tissues and decrease stiffness within the joint. Passive stretching and active and passive ROM exercises were performed to help decrease Mr A's knee flexion contracture. Strengthening exercises to the hip and knee were performed due to noted weakness and in an attempt to provide dynamic stability within the joint. Balance specific interventions were included in the treatments and were all performed without an assistive device. They

were chosen primarily based upon limitations identified by the BBS and DGI (Table 3). During weeks 1 and 2, Mr A walked at a comfortable pace while stepping over various objects that were increased in size as the task became less complicated. In weeks 3 and 4, items on the DGI were included to progress balance activities such as change in gait speed, vertical and horizontal head turns, gait and pivot turn, and stepping over and around objects. In week 4, the obstacle course also included 6 closely placed cones that Mr A weaved through to challenge his base of support. Mr A progressed to walking out into the community on uneven pathways and ascending and descending curbs. Community ambulation was included in the rehabilitation program as Mr A progressed in order to functionally challenge him in a more uncontrolled environment and allow the challenges of ambulating over uneven surfaces, and curbs of different heights.

Exercises to address limitations observed on the BBS were also performed in the parallel bars to provide additional upper extremity support and included tandem standing and single leg balance. Additional balance activities including tandem walking, sidestepping, walking backwards, and playing catch with a ball while maintaining balance were included as general balance activities not specifically related to noted limitations from the BBS and DGI.

OUTCOME

Mr A was seen 1 to 2 times a week for 5 weeks for a total of 9 physical therapy sessions. Outcome measures of the BBS, DGI, LEFS, and the NPRS were administered during visits 1, 5, and 9.

Mr A scored a 39/56 on the BBS during visit 5. At discharge, his score increased to a 53/56 moving him from a medium fall risk to a low fall risk (Table 2). Conradsson et al reported that in order to have a clinically meaningful difference in function within an older population, a change in 8 points on the BBS is required¹⁶ and Mr A surpassed this.

The minimal detectable change (MDC) for the DGI was calculated to be 2 points for patients with stroke.¹⁵ Mr A initially scored a 13/24 on the DGI and then meaningfully increased his score to 15/24 at visit 5 and to 22/24 at discharge showing a meaningful change from evaluation and visit 5 (Table 2). Mr A, at discharge, was no longer considered a risk for falls within the elderly community.¹⁵

Consistent with the meaningful improvements on the BBS and DGI, Mr A reported no longer using his cane for community ambulation at discharge. He attributed the lack of his need for a cane to his increased confidence in his balance.

Mr A increased his score on the LEFS, showing less difficulty with lower extremity function. To our knowledge, the reliability and validity of the LEFS has not been assessed in knee OA, but has been found to have a MDC of 9.9 points for individuals with hip OA.¹⁴ Mr A raised his score to 20/80 from the initial evaluation to visit 5, which did not show a meaningful change. At discharge, however, he improved his score to 44/80, indicating a meaningful clinical change (Table 2).

The NPRS has a minimal detectable change of 2 points in patients with low back pain.¹⁵ There was no meaningful change in pain from evaluation day to visit 5. His pain ratings during discharge were as follows:

worst: 8/10, current: 6/10, and best: 5/10 (evaluation pain ratings- worst: 9/10, current: 8/10, best: 6/10) (Table 1).

DISCUSSION

Individuals with knee OA may have associated balance deficits,^{8,9} and an increased risk of falls.^{10,11} Physical therapists working in an orthopaedic setting may include balance and proprioception exercises in the rehabilitation of individuals with knee pain; however, may be unfamiliar with valid measures to assess balance. This case report focuses on the use of validated outcome forms (the BBS and DGI) to assess balance and direct interventions in addition to the traditional impairment based treatment for an individual with a medical diagnosis of knee OA. The assessment of balance and inclusion of interventions specific to balance was thought to be an important addition to treatment, secondary to Mr A's history of a fall, reports of his knee giving way, and his insecurity when ambulating within the community.

Other studies have included balance exercises for patients with knee OA.^{1,18} Fitzgerald et al reported a case study of an individual with knee OA treated with agility and perturbation exercises who experienced a positive outcome in terms of pain and function.¹⁸ Similarly, Mr A experienced meaningful changes in function and balance. On the other hand, Mr A did not experience a meaningful change in pain as was experienced by the individual in the case study by Fitzgerald et al.¹⁸ Others have observed that balance deficits associated with knee OA are lessened with pain relief.¹⁹ In contrast to these findings, Mr A experienced a clinically meaningful improvement in function and balance without a reduction in pain. A plausible explanation is that interventions focused on specific deficient balance activities may be effective in improving balance and function in individuals with knee OA regardless of concomitant pain.

The limitations of this case included only observing one patient's outcomes when adding balance exercises to rehabilitation. The case only showed characteristics of outcomes corresponding to a specific physical therapy program in one elderly, inactive male and does not allow us to compare if the same improvements in function and balance would have been observed with a "standard" rehab program. While the inclusion of balance activities as directed by the BBS and DGI were associated with improved functional and balance outcomes in

Table 2. Changes in Measures of Balance and Function Observed During the Course of Rehabilitation

| Outcome Measure | Visit 1 (Evaluation) | Visit 5 | Visit 9 (Discharge) |
|----------------------------------|-------------------------|---------|------------------------|
| Berg Balance Scale | 26/56 | 39/56* | 53/56* |
| Dynamic Gait Index | 13/24 | 15/24* | 22/24* |
| Lower Extremity Functional Scale | 12/80 | 20/80 | 44/80* |

Key: Changes in measures of balance and function during the course of rehabilitation. * = clinically meaningful change

Table 3. Outcomes of Specific Items on the Dynamic Gait Index and the Berg Balance Scale which Directed Treatment

| Dynamic Gait Index Items (0-3 Scale) | Visit 1 | Visit 5 | Visit 9 |
|---|---------|---------|---------|
| Gait level surface (Item 1) | 2 | 3 | 3 |
| Change in gait speed (Item 2) | 1 | 2 | 3 |
| Gait with horizontal head turns (Item 3) | 2 | 2 | 3 |
| Gait with vertical head turns (Item 4) | 1 | 2 | 3 |
| Gait and pivot turn (Item 5) | 2 | 2 | 3 |
| Step over obstacle (Item 6) | 1 | 2 | 3 |
| Step around obstacles (Item 7) | 2 | 2 | 3 |
| Berg Balance Scale Items (0-4 scale) | Visit 1 | Visit 5 | Visit 9 |
| Sitting to standing (Item 1) | 3 | 3 | 4 |
| Turning 360° (Item 11) | 1 | 2 | 4 |
| Standing with one foot in front (Item 13) | 0 | 2 | 3 |
| Standing on one foot (Item 14) | 1 | 2 | 4 |

Key: Changes in impairments of strength, range of motion, and pain observed during the course of rehabilitation. Pain was assessed with a numeric rating scale anchored with 0= no pain at all and 10= worst pain imaginable. Average pain indicates the average of worst, current, and best pain rating for a given session.

this individual, the case study does not allow the determination of cause and effect.

The addition of balance exercises when treating older patients with knee OA may be an important factor in improving balance and preventing future falls. Adding balance exercises to Mr A's rehabilitation process may have been a factor that contributed to improved scores on the BBS and the DGI. Therefore, balance exercises could be used in conjunction with traditional treatment of knee OA to increase overall function and balance. Subsequently, balance as assessed by validated forms such as the BBS and DGI and interventions as directed by these measures may provide orthopaedic physical

therapists an effective addition to the typical rehabilitation of individuals with knee OA. Future studies should include randomized controlled trials to determine whether the inclusion of balance interventions as directed by the BBS and DGI are more effective than other common rehabilitation interventions for individuals with knee OA.

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(continued on page 97)

APPENDIX 1. BERG BALANCE SCALE

BALANCE SCALE*

Name _____

Date _____

Location _____ Rater _____

| ITEM | DESCRIPTION | SCORE (0-4) |
|--------------|--|-------------|
| 1. | Sitting to standing | _____ |
| 2. | Standing unsupported | _____ |
| 3. | Sitting unsupported | _____ |
| 4. | Standing to sitting | _____ |
| 5. | Transfers | _____ |
| 6. | Standing with eyes closed | _____ |
| 7. | Standing with feet together | _____ |
| 8. | Reaching forward with outstretched arm | _____ |
| 9. | Retrieving object from floor | _____ |
| 10. | Turning to look behind | _____ |
| 11. | Turning 360 degrees | _____ |
| 12. | Placing alternate foot on stool | _____ |
| 13. | Standing with one foot in front | _____ |
| 14. | Standing on one foot | _____ |
| TOTAL | | _____ |

GENERAL INSTRUCTIONS

Please demonstrate each task and/or give instructions as written. When scoring, please record the lowest response category that applies for each item.

In most items, the subject is asked to maintain a given position for specific time. Progressively more points are deducted if the time or distance requirements are not met, if the subject's performance warrants supervision, or if the subject touches an external support or receives assistance from the examiner. Subjects should understand that they must maintain their balance while attempting the tasks. The choices of which leg to stand on or how far to reach are left to the subject. Poor judgment will adversely influence the performance and the scoring.

Equipment required for testing are a stopwatch or watch with a second hand, and a ruler or other indicator of 2, 5, and 10 inches (5, 12.5, and 25 cm). Chairs used during testing should be of reasonable height. Either a step or a stool (of average step height) may be used for item #12.

1. SITTING TO STANDING

INSTRUCTIONS: Please stand up. Try not to use your hands for support.

- () 4 able to stand without using hands and stabilize independently
- () 3 able to stand independently using hands
- () 2 able to stand using hands after several tries
- () 1 needs minimal aid to stand or to stabilize
- () 0 needs moderate or maximal assist to stand

2. STANDING UNSUPPORTED

INSTRUCTIONS: Please stand for two minutes without holding.

- () 4 able to stand safely 2 minutes
- () 3 able to stand 2 minutes with supervision
- () 2 able to stand 30 seconds unsupported
- () 1 needs several tries to stand 30 seconds unsupported
- () 0 unable to stand 30 seconds unassisted

If a subject is able to stand 2 minutes unsupported, score full points for sitting unsupported. Proceed to item #4.

3. SITTING WITH BACK UNSUPPORTED BUT FEET SUPPORTED ON FLOOR OR ON A STOOL

INSTRUCTIONS: Please sit with arms folded for 2 minutes.

- 4 able to sit safely and securely 2 minutes
- 3 able to sit 2 minutes under supervision
- 2 able to sit 30 seconds
- 1 able to sit 10 seconds
- 0 unable to sit without support 10 seconds

4. STANDING TO SITTING

INSTRUCTIONS: Please sit down.

- 4 sits safely with minimal use of hands
- 3 controls descent by using hands
- 2 uses back of legs against chair to control descent
- 1 sits independently but has uncontrolled descent
- 0 needs assistance to sit

5. TRANSFERS

INSTRUCTIONS: Arrange chairs(s) for a pivot transfer. Ask subject to transfer one way toward a seat with armrests and one way toward a seat without armrests. You may use two chairs (one with and one without armrests) or a bed and a chair.

- 4 able to transfer safely with minor use of hands
- 3 able to transfer safely definite need of hands
- 2 able to transfer with verbal cueing and/or supervision
- 1 needs one person to assist
- 0 needs two people to assist or supervise to be safe

6. STANDING UNSUPPORTED WITH EYES CLOSED

INSTRUCTIONS: Please close your eyes and stand still for 10 seconds.

- 4 able to stand 10 seconds safely
- 3 able to stand 10 seconds with supervision
- 2 able to stand 3 seconds
- 1 unable to keep eyes closed 3 seconds but stays steady
- 0 needs help to keep from falling

7. STANDING UNSUPPORTED WITH FEET TOGETHER

INSTRUCTIONS: Place your feet together and stand without holding.

- 4 able to place feet together independently and stand 1 minute safely
- 3 able to place feet together independently and stand for 1 minute with supervision
- 2 able to place feet together independently and to hold for 30 seconds
- 1 needs help to attain position but able to stand 15 seconds feet together
- 0 needs help to attain position and unable to hold for 15 seconds

8. REACHING FORWARD WITH OUTSTRETCHED ARM WHILE STANDING

INSTRUCTIONS: Lift arm to 90 degrees. Stretch out your fingers and reach forward as far as you can. (Examiner places a ruler at end of fingertips when arm is at 90 degrees. Fingers should not touch the ruler while reaching forward. The recorded measure is the distance forward that the finger reach while the subject is in the most forward lean position. When possible, ask

subject to use both arms when reaching to avoid rotation of the trunk.)

- 4 can reach forward confidently >25 cm (10 inches)
- 3 can reach forward >12.5 cm safely (5 inches)
- 2 can reach forward >5 cm safely (2 inches)
- 1 reaches forward but needs supervision
- 0 loses balance while trying/ requires external support

9. PICK UP OBJECT FROM THE FLOOR FROM A STANDING POSITION

INSTRUCTIONS: Pick up the shoe/slipper which is placed in front of your feet.

- 4 able to pick up slipper safely and easily
- 3 able to pick up slipper but needs supervision
- 2 unable to pick up but reaches 2-5cm (1-2 inches) from slipper and keeps balance independently
- 1 unable to pick up and needs supervision while trying
- 0 unable to try/needs assist to keep from losing balance or falling

10. TURNING TO LOOK BEHIND OVER LEFT AND RIGHT SHOULDERS WHILE STANDING

INSTRUCTIONS: Turn to look directly behind you over toward left shoulder. Repeat to the right. Examiner may pick an object to look at directly behind the subject to encourage a better twist turn.

- 4 looks behind from both sides and weight shifts well
- 3 looks behind one side only other side shows less weight shift
- 2 turns sideways only but maintains balance
- 1 needs supervision when turning
- 0 needs assist to keep from losing balance or falling

11. TURN 360 DEGREES

INSTRUCTIONS: Turn completely around in a full circle. Pause. Then turn a full circle in the other direction.

- 4 able to turn 360 degrees safely in 4 seconds or less
- 3 able to turn 360 degrees safely one side only in 4 seconds or less
- 2 able to turn 360 degrees safely but slowly
- 1 needs close supervision or verbal cueing
- 0 needs assistance while turning

12. PLACING ALTERNATE FOOT ON STEP OR STOOL WHILE STANDING UNSUPPORTED

INSTRUCTIONS: Place each foot alternately on the step/stool. Continue until each foot has touched the step/stool four times.

- 4 able to stand independently and safely and complete 8 steps in 20 seconds
- 3 able to stand independently and complete 8 steps >20 seconds
- 2 able to complete 4 steps without aid with supervision
- 1 able to complete >2 steps needs minimal assist
- 0 needs assistance to keep from falling/unable to try

13. STANDING UNSUPPORTED ONE FOOT IN FRONT

INSTRUCTIONS: (DEMONSTRATE TO SUBJECT)

Place one foot directly in front of the other. If you feel that

you cannot place your foot directly in front, try to step far enough ahead that the heel of your forward foot is ahead of the toes of the other foot. (To score 3 points, the length of the step should exceed the length of the other foot and the width of the stance should approximate the subject's normal stride width)

- () 4 able to place foot tandem independently and hold 30 seconds
- () 3 able to place foot ahead of other independently and hold 30 seconds
- () 2 able to take small step independently and hold 30 seconds
- () 1 needs help to step but can hold 15 seconds
- () 0 loses balance while stepping or standing

14. STANDING ON ONE LEG

INSTRUCTIONS: Stand on one leg as long as you can without holding.

- () 4 able to lift leg independently and hold >10 seconds
- () 3 able to lift leg independently and hold 5-10 seconds
- () 2 able to lift leg independently and hold = or >3 seconds
- () 1 tries to lift leg unable to hold 3 seconds but remains standing independently
- () 0 unable to try or needs assist to prevent fall

() **TOTAL SCORE (Maximum = 56)**

APPENDIX 2. DYNAMIC GAIT INDEX

Grading: Mark the lowest category which applies. Total individual scores (24 possible). Scores of 19 or less have been related to increase incidence of falls in the elderly.

1. Gait Level Surface _____

Instructions: Walk at your normal speed from here to the next mark (20').

Grading: Mark the lowest category that applies.

- (3) Normal:** Walks 20', no assistive devices, good speed, no evidence for imbalance, normal gait pattern.
- (2) Mild impairment:** Walks 20', uses assistive devices, slower speed, mild gait deviations.
- (1) Moderate impairment:** Walks 20', slow speed, abnormal gait pattern, evidence for imbalance.
- (0) Severe impairment:** Cannot walk 20' without assistance, severe gait deviations, or imbalance.

2. Change in gait speed _____

Instructions: Begin walking at your normal pace (for 5'), when I tell you "go," walk as fast as you can (for 5'). When I tell you "slow," walk as slowly as you can (for 5').

- (3) Normal:** Able to smoothly change walking speed without loss of balance or gait deviation. Shows a significant difference in walking speeds between normal, fast, and slow speeds.
- (2) Mild impairment:** Able to change speed but demonstrates mild gait deviations, or no gait deviations but unable to achieve a significant change in velocity, or uses and assistive device.
- (1) Moderate impairment:** Makes only minor adjustments to walking speed, or accomplishes a change in speed with significant gait deviations, or changes speed but has significant gait deviations, or changes speed but loses balance but is able to recover and continue walking.
- (0) Severe impairment:** Cannot change speeds, or loses balance and has to reach for wall or be caught.

3. Gait with horizontal head turns _____

Instructions: Begin walking at your normal pace. When I tell you to "look right," keep walking straight, but turn your head to the right. Keep looking to the right until I tell you "look left," then keep walking straight and turn your head to the left. Keep you

head to the left until I tell you, "look straight," then keep walking straight but return your head to the center.

- (3) Normal:** Performs head turns smoothly with no change in gait.
- (2) Mild impairment:** Performs head turns smoothly with slight change in gait velocity (i.e., minor disruption to smooth gait path or uses walking aid).
- (1) Moderate impairment:** Performs head turns with moderate change in gait velocity, slows down, staggers but recovers, can continue to walk.
- (0) Severe impairment:** Performs task with severe disruptions of gait (i.e., staggers outside 15° path, loses balance, stops, reaches for wall).

4. Gait with vertical head turns _____

Instructions: Begin walking at your normal pace. When I tell you to "look up," keep walking straight, but tip your head and look up. Keep looking up until I tell you "look down," then keep walking straight and turn your head down. Keep looking down until I tell you, "look straight," then keep walking straight but return your head to the center.

- (3) Normal:** Performs head turns with no change in gait.
- (2) Mild impairment:** Performs task with slight change in gait velocity (i.e., minor disruption to smooth gait path or uses walking aid).
- (1) Moderate impairment:** Performs tasks with moderate change in gait velocity, slows down, staggers but recovers, can continue to walk.
- (0) Severe impairment:** Performs task with severe disruption or gait (i.e., staggers outside 15° path, loses balance, stops reaches for wall).

5. Gait and pivot turn _____

Instructions: Begin walking at your normal pace. When I tell you to "stop and turn," turn as quickly as you can to face the opposite direction and stop.

- (3) Normal:** Pivot and turns safely within 3 seconds and stops quickly with no loss of balance.
- (2) Mild impairment:** Pivot turns safely in >3 seconds and stops with no loss of balance.
- (1) Moderate impairment:** Turns slowly, requires verbal cueing, requires several small steps to catch balance following

turn and stop.

(0) Severe impairment: Cannot turn safely, requires assistance to turn and stop.

6. Step over obstacle _____

Instructions: Begin walking at your normal speed. When you come to the shoe box, step over it, not around it, and keep walking.

(3) Normal: Able to step over box without changing gait speed; no evidence for imbalance.

(2) Mild impairment: Able to step over box, but must slow down and adjust steps to clear box safely.

(1) Moderate impairment: Able to step over box but must stop, then step over. May require verbal cueing.

(0) Severe impairment: Cannot perform without assistance.

7. Step around obstacles _____

Instructions: Begin walking at your normal speed. When you come to the first cone (about 6' away), walk around the right side of it. When you come to the second cone (6' past first cone), walk around it to the left.

(3) Normal: Able to walk around cones safely without changing gait speed; no evidence of imbalance.

(2) Mild impairment: Able to step around both cones, but must slow down and adjust steps to clear cones.

(1) Moderate impairment: Able to clear cones but must significantly slow speed to accomplish task, or requires verbal cueing.

(0) Severe impairment: Unable to clear cones, walks into one or both cones, or requires physical assistance.

8. Stairs _____

Instructions: Walk up these stairs as you would at home (i.e., using the rail if necessary). At the top, turn around and walk down.

(3) Normal: Alternating feet, no rail.

(2) Mild impairment: Alternating feet, must use rail.

(1) Moderate impairment: Two feet to stair, must use rail.

(0) Severe impairment: Cannot perform safely.

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Measurement of Functional Outcome during Rehabilitation for a Knee Dislocation with Peroneal Nerve Injury: A Case Report

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ABSTRACT

Background and Purpose: Very few studies have quantified functional outcome following knee dislocation. One reason may be that performance tests typically used to measure function after knee injury, such as hop tests, are too demanding for this population. The purpose of this case report is to describe knee impairments and functional outcome for a patient with a knee dislocation during the first 16 weeks of rehabilitation. Function was measured with a self-report questionnaire and performance tests that are novel for this population. **Case Description:** A 34-year-old male who sustained a left knee dislocation and peroneal nerve injury began physical therapy 5 days after open LCL re-attachment with ACL and PCL reconstruction. Rehabilitation focused on therapeutic exercise, neuromuscular electrical stimulation, and gait training. Knee impairments and function were assessed at 10, 13, and 16 weeks postsurgery. The knee impairments included pain intensity and knee passive range of motion (PROM) and functional measures included the International Knee Documentation Committee (IKDC) subjective form, sit to stand test, and 10 meter walk test. In addition, isometric quadriceps strength was assessed on an isokinetic dynamometer at 16 weeks and the quadriceps index [(injured side torque/uninjured side torque)*100] was computed. **Outcomes:** The patient's pain rating was 3/10, 2/10, and 0/10 and knee PROM was 0/5/80°, 0/5/90°, and 0/0/98° at 10, 13, and 16 weeks postsurgery respectively. The patient's quadriceps index at 16 weeks was 65.8%. Clinically meaningful improvements were found in the IKDC subjective form score from 13 to 16 weeks postsurgery, and the 10 meter walk test from 10 to 13 weeks and 13 to 16 weeks postsurgery. The sit to stand test time improved, however did not exceed measurement error. **Discussion:** This case report demonstrates a clinically meaningful change

in function using the IKDC subjective form score and the 10 meter walk test speed for a patient following knee dislocation with nerve injury. It is important to note that the IKDC subjective form score at 16 weeks is typically found in other patients with knee ligament injury, which documents the need for extended supervised rehabilitation for this population. The 10 meter walk test was useful for documenting a performance-based improvement in function and should be considered for use in people with knee injury that cannot perform hop testing.

Key Words: knee dislocation, nerve injury, functional outcome

INTRODUCTION

Knee dislocation is a severe injury that involves rupture of at least 3 major ligaments of the knee. The prevalence of knee dislocation is fairly low, accounting for only .11% of all knee injuries.^{1,2} The anterior cruciate ligament (ACL) is ruptured in 91% of knee dislocation cases, making it the most commonly injured ligament, followed by the posterior cruciate ligament (PCL), lateral collateral ligament (LCL), and medial collateral ligament (MCL) in 73%, 64%, and 27% of the knee dislocations, respectively. Neurovascular structures are susceptible to injury in a knee dislocation due to disruption of the knee joint surfaces. The popliteal artery is injured in 14% of knee dislocations, and the peroneal nerve is injured in up to 25% of knee dislocations.^{3,4} Due to the severity of the injury, knee dislocation always requires surgical management and extensive rehabilitation.

Functional outcome after knee dislocation is not well understood. Most studies of knee dislocations report surgical outcomes, such as knee laxity and physical examination measures; however, a few studies have examined functional outcome using self-report questionnaires. Liow et al² used the Lysholm scale, a self-report measure of knee

function in daily activities, and the Tegner Activity Rating Scale, a self-report of activity level, to investigate functional outcome for 21 subjects who were an average of 32 months postsurgery for knee dislocation. The mean Lysholm score was 79 out of 100 and the mean Tegner Activity rating was 5 out of 10. A Tegner Activity rating of 5 indicates that the highest level of activity for work was heavy labor, for competitive sports was cycling and cross-country skiing, and for recreational sports was jogging on an uneven ground at least twice weekly.² Harner et al⁵ assessed function in 31 patients who were 44 months postsurgery for knee dislocation by administering the Knee Outcome Survey (KOS) Activities of Daily Living Scale and Sports Activity Scale, which are self-report questionnaires that assess symptoms and functional limitations during daily activities and sports participation, respectively. The mean KOS-Activities of Daily Living score was 89% and the KOS-Sports Activity score was 82%.⁵ These scores indicate that while patients are functioning in daily activities and participating in sports, their knee is not functioning at maximum potential even at 3 years postsurgery.

Performance-based tests are another method of assessing function after knee injury. Hop testing is a common performance-based measure of function used during ACL rehabilitation to facilitate clinical decision making.⁶ Hop testing, however, is likely to be too demanding for patients following knee dislocation in the time frames typically administered to patients with ACL reconstruction (eg, 12 weeks-6 months postsurgery). Therefore, to quantify performance-based improvements in function for patients with knee dislocation within these time frames, less-demanding tests would need to be used.

The purpose of this case is to report functional outcome for a patient with a knee dislocation and peroneal nerve injury in the



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first 16 weeks of rehabilitation. Similar to other knee rehabilitation studies, we used a combination of a self-report questionnaire and performance testing to assess functional outcome. However, this case report employed novel methods for performance testing that have not been previously reported in the knee rehabilitation literature. In addition, knee impairments were assessed to give additional information on the patient's clinical status.

CASE DESCRIPTION

History

The patient was a 34-year-old male seen in an outpatient physical therapy clinic 5 days following open LCL reattachment and arthroscopic reconstruction of the ACL and PCL with allograft tissue. The patient stated that he injured his left knee while playing with his dog at home when he twisted quickly to the right with his left foot planted. The patient reported falling to the ground and hearing a loud pop. He was taken immediately to the emergency room and magnetic resonance imaging (MRI) confirmed a torn left ACL, PCL, and LCL. Physical examination confirmed a peroneal nerve palsy resulting in foot drop. The patient underwent

surgery the day after the injury. Prior to surgery, the patient had no significant injuries to either knee and no medical conditions. He was employed as a supervisor at a home supply store and participated in recreational basketball 2 to 3 times per week.

Examination

The patient arrived to the initial physical therapy visit ambulating on crutches touch down weight bearing (TDWB), allowing only 20% body weight to weight bear throughout the entire left foot. The patient wore a knee immobilizer and had a postoperative knee dressing from distal to proximal of the knee, which prohibited observation and knee range of motion measurements. He wore an ankle foot orthosis (AFO), and when the AFO was removed it was found that the patient had no voluntary movement into ankle dorsiflexion, ankle eversion, or 1st toe dorsiflexion.

Pain intensity was assessed using the numerical rating scale (NRS). The NRS asks the patient to rate his current pain intensity on an 11 point scale from 0 to 10 (0=no pain, 10=worst pain imaginable). The NRS has been shown to have test-retest reliability (ICC = .67, SEM = 1.36) and has been

shown to be valid when used to assess the effects of treatment on pain.⁷ The patient rated his current pain as 9/10.

Evaluation and Prognosis

A full physical examination was limited by the postoperative dressing; however, impairments revealed in the initial visit were 9/10 pain rating, left lower extremity foot drop, and an inability to ambulate without crutches. The patient was currently on medical leave from work. Due to his impairments and the severity of the injury, the patient was estimated to be seen in therapy 1 to 2 times per week for 24 to 32 weeks.

INTERVENTION

Rehabilitation Protocol

Per the physician orders, the patient was to be in a knee immobilizer and locked at 0° extension for the first 6 weeks. The patient was limited to TDWB with axillary crutches and 0° to 90° passive knee range of motion for 6 weeks and was not allowed to perform open chain knee flexion for 6 months.

Overview of Interventions

The patient was seen for physical therapy 1 to 2 times per week for 16 weeks following

Table 1. Time Allotted to Each Treatment during Rehabilitation

| Week | PT Sessions | Ther Ex (min) | NMES (min) | Gait training (min) | Total Time |
|------|-------------|---------------|------------|---------------------|------------|
| 1 | 1 | 30 | 15 | | 45 |
| 2 | 2 | 60 | 30 | | 90 |
| 3 | 2 | 60 | 30 | | 90 |
| 4 | 2 | 60 | 30 | 15 | 105 |
| 5 | 2 | 60 | 30 | 15 | 105 |
| 6 | 2 | 60 | 15 | 25 | 100 |
| 7 | 1 | 30 | 15 | 10 | 55 |
| 8 | 2 | 60 | 30 | 20 | 110 |
| 9 | 2 | 60 | 30 | 20 | 110 |
| 10 | 2 | 90 | | 20 | 110 |
| 11 | 1 | 45 | | 15 | 60 |
| 12 | 1 | 60 | | | 60 |
| 13 | 1 | 60 | | | 60 |
| 14 | None | - | | | - |
| 15 | 2 | 120 | | | 120 |
| 16 | 1 | 60 | | | 60 |

surgery, except in week 14 when the patient did not have rehabilitation secondary to scheduling constraints. Rehabilitation visits consisted of therapeutic exercise, neuromuscular electrical stimulation, and gait training. The amount of time spent each week on the intervention is listed in Table 1.

Neuromuscular Electrical Stimulation

The patient received neuromuscular electrical stimulation (NMES) to the left quadriceps muscle for the first 9 weeks of rehabilitation. The patient lay supine on a table and 2" x 5" rectangular electrodes with adhesive gel were placed on the distal medial portion and the proximal lateral portion of the quadriceps muscle. The patient received NMES for 15 minutes using a cycle of 15 seconds on and 30 seconds off. The intensity was set until a tolerable, visible quadriceps contraction was produced and was increased every 5 minutes as allowed. The patient was instructed to voluntarily contract his quadriceps during the "on" phase.

Knee Range of Motion

Passive range of motion was performed per physician's orders. Beginning at 1 week

postsurgery, the patient sat at the edge of the table and the therapist passively moved the left knee into flexion and extension for 5 to 10 minutes. This intervention was performed at all sessions. Starting at 11 weeks postsurgery, knee ROM was also performed on a stationary bike. Initially the patient performed active assisted ROM using his right lower extremity to push the left lower extremity as far as it could go in a pain free range. He was able to complete a full revolution at 13 weeks postsurgery and from that visit forward performed revolutions on the bike for 5 minutes at low intensity.

Quadriceps Strengthening

The patient performed 4 different quadriceps strengthening exercises during therapy: quad sets, straight leg raises, leg press, and long arc quads (LAQs). The patient performed quad sets in supine by voluntarily contracting the left quadriceps for 3 to 5 seconds. Following this exercise, the patient performed straight leg raises involving voluntarily contraction of the quadriceps and raising the extended knee into hip flexion. The quad sets and straight leg raises both progressed by repetition from 2 sets of 10 repetitions at 1 week postsurgery to 3 sets

of 20 repetitions at 15 weeks postsurgery based on the patient's ability to perform the sets without visible fatigue.

At 8 weeks postsurgery, the leg press was added to treatment. The patient performed the leg press for 3 sets of 20 repetitions at 40 pounds using both lower extremities. The exercise was progressed at 12 weeks postsurgery by having the patient use only his left lower extremity to perform the same repetitions and weight, and at 15 weeks postsurgery resistance was increased to 60 pounds.

At 10 weeks postsurgery, the patient performed LAQs seated at the end of the treatment table. The patient was able to perform 3 sets of 20 LAQs with a 2 pound weight on his ankle. This increased each week by 1 pound up to 6 pounds as the patient performed the exercise without visible fatigue.

Gait Training

The patient received gait training from 4 weeks to 11 weeks postsurgery. For the first 2 weeks of gait training, the patient wore a knee immobilizer and for all sessions the patient wore an AFO on his left lower extremity. Gait training began with 2 axillary crutches and progressed to a single axillary crutch at 8 weeks postsurgery followed by a cane at 10 weeks postsurgery.

Functional Strengthening & Balance

At 10 weeks postsurgery, the patient performed step ups onto a 4-inch step using a cane to assist with balance. The patient performed 3 sets of 10 step ups, stepping with the left leg first followed by the right. At 12 weeks postsurgery, the patient was progressed to a 6-inch step, also using a cane for balance, and at 15 weeks postsurgery performed step ups on a 6-inch step without assistance from a cane.

At 10 weeks postsurgery, single leg stance balance exercises were also initiated. The patient stood only on his left lower extremity 3 times each for 45 seconds using bilateral hand support at a table. As the patient's balance improved, this progressed to 1 minute with only right hand support at 13 weeks and 1 minute with only right fingertip support at 15 weeks.

Home Exercise Program

The patient was instructed to perform a home exercise program 1 to 2 times per day that consisted of quad sets, straight leg raises, step ups with a rail and cane, and single leg balance with assistance from a counter

Table 2. Knee Impairments

| | 10 weeks | 13 weeks | 16 weeks |
|---------------------|----------|----------|----------|
| Current Pain Rating | 3/10 | 2/10 | 0/10 |
| Knee PROM | 0/5/80° | 0/5/90° | 0/0/98° |
| Quadriceps Index | NT | NT | 65.8% |

top. He had a stationary bike at home and was instructed to perform 10 minutes of cycles on it for range of motion once a day. Finally, he was instructed to perform a heel prop for 10 minutes daily to promote knee extension, which was performed by placing the heel of his foot on a wedge while in a long sitting or supine position.

OUTCOMES

Function was the outcome of primary interest in this case report, and functional outcome was assessed using a self-report of function questionnaire (IKDC subjective form) and performance-based testing (sit to stand and 10 m walk test). Knee impairments were assessed to gain additional information about the patient's clinical status and included pain rating, knee range of motion, and quadriceps strength. Outcome measures were collected at 10, 13, and 16 weeks postsurgery, except quadriceps strength, which was only measured at 16 weeks postsurgery.

Pain

As mentioned previously, pain intensity was assessed using the NRS. The patient's pain intensity decreased over time as shown in Table 2.

Knee Range of Motion

A universal goniometer was used to measure the patient's passive knee range of motion. With the patient in supine, the therapist passively moved the patient's knee into position. The axis of the goniometer was placed on the joint line, while the stationary arm was on line from the knee joint to the greater trochanter and the moveable arm was along the lateral aspect of the fibula to the lateral malleolus. The universal goniometer has been found to be reliable (passive knee flexion, ICC = .88, SEM = 5.16; passive knee extension, ICC = .62, SEM = 3.05), and valid when compared to radiograph estimates (knee flexion, $r = .975-.987$; knee extension, $r = .390-$

.442).^{8,9} The patient's passive knee range of motion improved over time and can be found in Table 2.

Quadriceps Strength

At 16 weeks postsurgery, the patient's maximum voluntary isometric contraction (MVIC) of the quadriceps was assessed using an isokinetic dynamometer (Biodex System3). The isokinetic dynamometer has been found to be very reliable for assessing isometric muscle strength (ICC = .99, SEM = 3.95).¹⁰ The patient was seated and stabilized in an isokinetic dynamometer with the knee fixed at 60° flexion. The patient produced 3 maximal effort contractions, holding each contraction for 5 seconds and resting for 30 seconds between contractions. A quadriceps index was computed by comparing the injured side MVIC to the uninjured side MVIC [(injured MVIC/uninjured MVIC) x 100]. Quadriceps index values are listed in Table 2.

IKDC Subjective Form

The IKDC subjective form is an 18-item knee-specific self-report outcome measure that assesses symptoms and functional limitations. Each item is scored individually and then summed and transferred to a scale from 0 to 100 ranging from lowest level of function to highest level of function. The IKDC subjective form has been found to be reliable in patients with ligament injuries (ICC = .94, SEM = 4.6), and valid ($r = .66$ and $r = .47$) when compared to physical function and role limitations due to physical problems. A change of ± 9.0 is needed to be 95% confident that a change has occurred on the IKDC subjective form.³ As shown in Figure 1, the IKDC subjective form score increased and demonstrated a clinically relevant change from 13 to 16 weeks postsurgery.

Sit to Stand Test

The sit to stand test has been used to assess mobility and lower extremity strength

in older population.¹¹ The test was chosen as it is a less-demanding performance test than typical performance tests used during knee rehabilitation such as hop testing. The patient performs 5 trials of sit to stand from a standard height chair (.43 m) as quickly as possible, and time is started when the patient leaves the initial seated position and stopped when the patient returns to the final seated position. The test has been found to be reliable (ICC = .89, SEM = 1.82) as well as valid in predicting falls in an older population (sensitivity = .66, specificity = .55).¹² The patient performed this test 3 times at each time point, and the average score of the 3 tests was recorded. The patient's time on the sit to stand test improved as demonstrated in Figure 2; however, it did not exceed standard measurement error.

10 Meter Walk Test

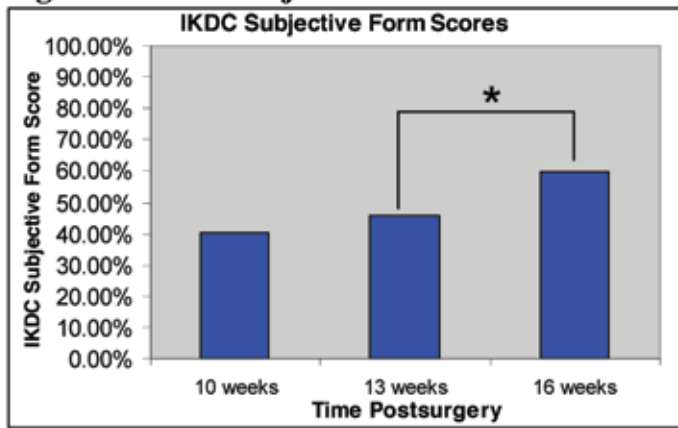
The 10 meter walk test was used to assess the patient's gait speed (see Figure 3). The test was chosen as it has been previously shown to detect changes in function in patients with nerve injury resulting in foot drop.¹³ The patient was instructed to walk at a comfortable pace over a 12 meter distance marked on the floor; however, only the middle 10 m distance was timed to eliminate acceleration and deceleration effects. The test has been found to be reliable (ICC = .98, SEM = .03) in a healthy population, as well as valid in a population with neurologic impairment when compared to similar mobility tests.^{14,15} Speed on the 10 meter timed walk test is shown in Figure 3, and clinically meaningful improvements in speed are seen between 10 to 13 weeks postsurgery and 13 weeks to 16 weeks postsurgery.

DISCUSSION

The purpose of this case report was to examine functional outcome after a knee dislocation with peroneal nerve injury. Function improved at each time point with clinically relevant changes in the IKDC subjective form score and the 10 meter walk test speed. The results of this case report help provide information on expected functional recovery following knee dislocation and in addition can be used as a benchmark to compare with other populations.

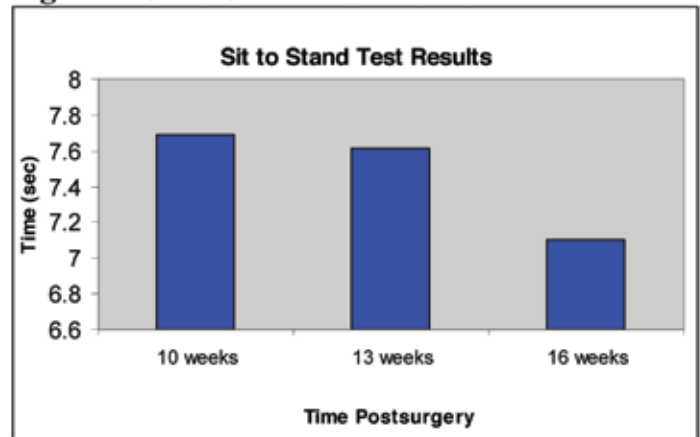
To the best of our knowledge, this study is the first to report IKDC subjective form scores for a patient with a knee dislocation. The patient's IKDC subjective form score improved from 45.98% at 13

Figure 1. IKDC Subjective Form Scores



* Clinically relevant change from 13 to 16 weeks postsurgery

Figure 2. Sit to Stand Test Results



weeks to 59.77% at 16 weeks postsurgery. Chmielewski et al reported a mean IKDC subjective form score of 74.68% for patients with isolated ACL reconstruction that were 13 to 25 weeks postsurgery.¹⁶ The patient in this case report demonstrated a significantly lower IKDC subjective form score than these patients following isolated ACL reconstruction at a similar time frame during rehabilitation. Comparing the functional abilities and impairments of this patient to patients following isolated ACL reconstruction helps to explain why an individual with a knee dislocation may require extended time during rehabilitation and does not progress as quickly when compared to patients with other knee pathologies.

In addition, this study presents 2 novel methods for performance testing during knee rehabilitation. The patient's speed on the 10 meter walk test improved from 1.35 m/s at 10 weeks postsurgery to 1.41 m/s at 13 weeks postsurgery and 1.45 m/s at 16 weeks postsurgery. While the 10 meter walk test has not previously been used as a performance test during knee rehabilitation, it is often assessed in patients with neurological impairments. Speed on the 10 meter walk test has been reported as .80 m/s in patients with hemiplegia with foot drop, and 1.43 m/s in a healthy population.^{14,15} Therefore, at 10 weeks postsurgery, the patient in this case study ambulated at a faster speed than patients with hemiplegia with foot drop and initially at a slower rate than healthy individuals. However, at 16 weeks postsurgery the patient's gait speed was even faster speed than an average healthy individual. The 10 meter walk test has not previously been studied in patients following knee injury;

however, in this case it captured functional improvement and therefore may be an appropriate performance measure for patients following knee dislocation.

While a clinically relevant functional change occurred in the IKDC subjective form score and the 10 meter walk test speed, it did not occur in the sit to stand test. The patient's sit to test time was 7.69 sec when initially assessed at 10 weeks postsurgery and 7.1 sec at 16 weeks postsurgery. These scores show improvement, but the magnitude of change did not exceed measurement error. The sit to stand test is typically used in an older population and time for healthy individuals above the age of 73 years old has been reported as 9.82 sec.¹² The patient in this case report demonstrated a significantly faster time by 2.13 sec at initial testing at 10 weeks postsurgery than these individuals. Therefore, while the test showed improvement in the patient's speed it may not be a difficult enough task for the patient to detect meaningful change in function and may be more appropriate for older populations.

There are limitations in the interpretation of the results of this case report that can be addressed in future research. First, this study is limited by sample size and a larger prospective study is needed to determine if these results would be consistent in a larger population. Second, it is unknown if these novel tests can be applied and show change in every patient with a knee dislocation. Although this study is the first to report functional outcome with performance tests in this population, further research is needed to determine if these tests are appropriate for every patient with a knee dislocation. Finally, in this study functional outcome was

assessed in a limited time frame from 10 to 16 weeks postsurgery. A longer period during rehabilitation would help to demonstrate more longitudinal changes and perhaps show functional change in the sit to stand test. For this case report, however, the time frame was efficient enough to demonstrate functional change in the IKDC subjective form score and the 10 meter walk test speed.

CONCLUSION

Functional improvements were demonstrated in the IKDC subjective form score and the 10 meter walk test in a patient with a knee dislocation and peroneal nerve injury. Time during the sit to stand test, however, did not improve enough to exceed measurement error. This case report is the first to present functional outcomes using performance tests for this population. The results of this case report provide information to help counsel patients on recovery as well as provide a basis for further inquiry into the use of the 10 meter walk test as a performance test in patients with knee dislocations and nerve injury.

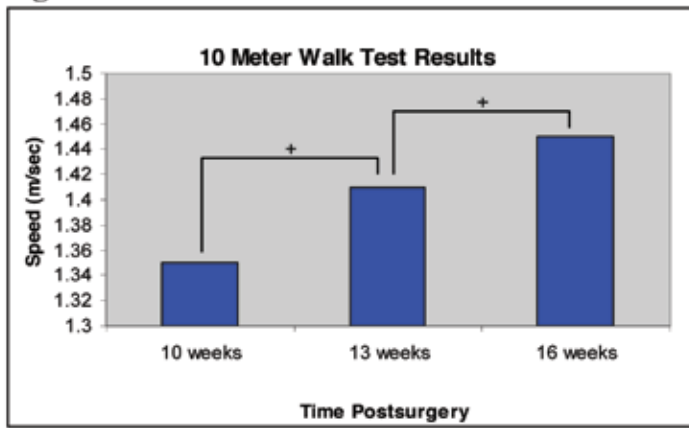
ACKNOWLEDGMENTS

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Figure 3. 10 Meter Walk Test Results



+Clinically relevant change from 10 weeks to 13 weeks and 13 weeks to 16 weeks postsurgery

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Book Review

Michael J. Wooden, PT, MS, OCS
Book Review Editor

Andrews JR, David TS, eds. *Arthroscopic Techniques of the Knee: A Visual Guide*. Thorofare, NJ: Slack, Inc.; 2009, 228 pp., illus.

Andrews JR, David T, eds. *Arthroscopic Techniques of the Hip: A Visual Guide*. Thorofare, NJ: Slack, Inc.; 2010, 175 pp., illus.

These two volumes are continuations of the Slack Visual Arthroscopy Series. The initial book covered the shoulder and was published in 2009. Similar to the shoulder volume, the intention of the book on the knee is to “illustrate their current, detailed step-by-step technique for a topic in arthroscopic knee surgery as if they were teaching their own fellows in the operating room.” Although no specific purpose was defined for the hip series, one could assume the intention was similar to that of the knee, since the format and styling are similar and it is all part of a series on arthroscopic surgeries.

The hip volume is comprised of 13 chapters and the knee 15 chapters. In the first 2 chapters, each book includes details on surgical positioning and set up. Tips and clinical pearls as well as pitfalls are also covered at the end of the chapter, allowing the reader to learn from past experiences of surgeons who are experts in their respective areas. A separate chapter on arthroscopic portals is included in the hip volume and a separate chapter on anesthesia is covered in the knee volume. Both of these chapters go into detail under their particular topics with clinical tips and pearls and pitfalls at the end.

The remaining chapters of the books cover various arthroscopic surgical procedures. Both books cover diagnostic arthroscopy and microfracture. In the hip volume, additional topics include removal of loose bodies and excision of PVNS/synovial chondromatosis, acetabular labral repair with rim trimming and femoral head-neck osteoplasty, management of pincer impingement, femoroacetabular impingement-femoral osteochondroplasty for cam impingement, iliopsoas tendon release, abductor repairs, iliotibial band release, revision hip arthroscopy, acetabular labral reconstruction using an iliotibial and autograft.

In the knee volume additional topics include meniscal repair, osteochondral transplantation, autologous chondrocyte implantation, pediatric osteochondral injuries, single-bundle ACL reconstruction using patellar tendon grafts: transtibial endoscopic hybrid technique, anatomic double-bundle ACL reconstruction, ACL arthroscopically assisted internal fixation of tibial spine avulsion fractures, single-bundle PCL reconstruction, PCL reconstruction, including single-bundle tibial inlay technique, transtibial double-bundle PCL reconstruction, and treatment of arthrofibrosis of the knee.

Each chapter on the surgical procedures for the hip and knee includes surgical goals, operative steps, tips and pearls, and pitfalls. Conditions that can have additional variations in performing the surgery are also included. Diagnoses covered are pincher impingement and meniscal tear.

The objective of the editors was clearly achieved. Similar to the shoulder volume, these books are very well organized and in bullet-style format, making it easy for the reader to search for information. Color pictures of the surgical procedure, equipment, landmarks, and positioning are included, allowing the reader to fully visualize the process of each surgical procedure. For a reader who is less familiar with the procedures described in these books, they provide great insight as to what occurs in the operating room. These serve as a handy reference for anyone who is involved in the surgical care of patients, from physicians to therapists, of any level. Additionally, these books serve as a great way for professionals to educate their patients about the surgical procedure that they are either going to have, or have already had done. I would highly recommend these two volumes to any clinician involved in the rehabilitation of arthroscopic treatment of the hip and knee.

Michelle Finnegan, DPT, OCS, MTC, FAAOMPT

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OUTSTANDING PHYSICAL THERAPIST ASSISTANT STUDENT AWARD

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be involved in professional organizations and activities that provide the potential growth and contributions to the profession and orthopaedic physical therapy.

Valerie A. Cooper is a second-year student in the Physical Therapist Assistant Program at Somerset Community College in Somerset, Kentucky. Ms. Cooper is not only an outstanding student at the top of her class but is highly involved in several service activities outside of the classroom. She was elected to serve as the Vice President of her class and was co-chair of the Program's fundraising efforts in the 2009 Georgia State-Marquette Challenge for the Foundation of Physical Therapy. As a result of her and her classmate's efforts, the program was honored by the Foundation as the "Most Successful Physical Therapist Assistant Program" in the 2009 Challenge. In addition, she served as the student co-coordinator for the SCC 2009 Physical Therapy Open House, which is a large recruiting event that is open to all faculty, staff, students, and the community and serves as a means of educating the public about the physical therapy profession. Ms. Cooper was also an active participant in the KPTA-sponsored Kentucky Special Olympics' free sports screening for rural athletes and also co-authored a brochure describing the benefits of sports-related physical activity for elderly populations that was featured in an article published in the APTA Student Assembly's February 2009 newsletter. In recognition of her numerous professional activities she was named the recipient of James A. Anderson Award, which is the highest honor presented in the program. One of her student colleagues notes that Valerie does whatever she can to help her fellow students. One of her clinical instructors writes "she serves as an excellent role model to students balancing academics and community service." It is obvious that Valerie A. Cooper is truly an outstanding individual and a most worthy recipient of the Outstanding Physical Therapist Assistant Student Award who has the potential to contribute to the Orthopaedic Section of the APTA.



OUTSTANDING PHYSICAL THERAPY 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 their 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.

The recipient of the Outstanding Physical Therapy Student Award is **Brooke R. Winder**. Ms. Winder received her Bachelor of Fine Arts in Dance from Chapman University in Orange, California. She will graduate in May of 2010 from the Doctor of Physical Therapy (DPT) program at the University of Southern California. The mission of the University of Southern California's DPT program is to educate authoritative practitioners and future leaders in the profession of physical therapy. Ms. Winder embraced this mission wholeheartedly through her pursuit of excellence in both the classroom and clinical environments. In addition to balancing the demands of her professional program, Brooke has also served as a research assistant in the Musculoskeletal Biomechanics Laboratory. Her research activities that assessed biomechanical patterns involved in dance-specific skills resulted in a successful abstract submission and poster presentation at CSM 2009. Based on the poster presentation, she was awarded a student research scholarship by the Performing Arts Special Interest Group. In addition to her academic and research activities, Brooke has also served as the Student Committee Chair for the AAOMPT Student SIG working to increase student membership and involvement. She has also served as a volunteer for several health fairs that provide important information regarding health and wellness to underserved communities throughout the Los Angeles metropolitan area. One of her professor's notes that "we have been very fortunate to have Brooke in our program here at USC – she has made an impact in a way that rarely occurs with our students." One of her student colleagues states, "Brooke exemplifies the compassionate heart of a physical therapist – she is kind, attentive, generous, and presents with the quiet dignity of one who gives all of herself – she has been a beacon to our class." It is obvious that Brooke R. Winder is truly an outstanding student and a most worthy recipient of the Outstanding Student Award, with a tremendous potential to contribute to the Orthopaedic Section of the APTA.



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/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.

Ron Andrews, PT, PhD, is the 2010 recipient of the James A. Gould III Excellence in Teaching Orthopaedic Physical Therapy Award. Dr. Andrews is an Associate Professor in the Physical Therapy Program at the University of New Mexico School of Medicine. As a faculty member teaching in the entry-level physical therapy program, Dr. Andrews epitomizes the role of teacher, mentor, and clinician.

Since joining the Program in Physical Therapy at the University of New Mexico in 1991, Dr. Andrews has served as one of the primary instructors for the orthopaedics/manual therapy courses in the curriculum. In addition while serving as the Physical Therapy Program Director, Dr. Andrews was the primary architect of the Master of Physical Therapy program. With the start of the new DPT program, Dr. Andrews has worked closely with the other orthopaedic faculty to integrate the orthopaedic and kinesiology curriculum with gross anatomy. One of his colleagues notes, "his approach to teaching is best described as student orientated; he continually strives to improve his lectures and labs to enhance student learning." Another colleague notes, "Ron is a teacher in the truest sense – one thing that contributes to his remarkable success in teaching orthopaedics is that he is equally skilled in teaching the cognitive and psychomotor aspects of the course." Dr. Andrews always promotes an integrative and patient-centered approach with his students. He effectively incorporates emerging research and evidence-based concepts into his didactic coursework using a variety of instructional methodologies. As noted by another of his colleagues, "Perhaps Ron's most remarkable attribute in the classroom is that, despite being widely recognized in our community for his exceptional orthopaedic clinical skills, he brings no ego or personal agenda to class – He is humble and genuinely motivated to help his students develop into exceptional clinicians." Both current and former students speak highly of Dr. Andrew's dedication and knowledge in the area of musculoskeletal physical therapy. One student states, "What made Dr. Andrew's different was his

calm delivery, hand-over-hand guidance, and limitless amount of patience." Another former student writes, "Ron devoted the majority of his time to developing us, his students, to be highly thoughtful and scientifically critical physical therapists."

It is obvious that Dr. Ron Andrews is a most worthy recipient of the James A. Gould Excellence in Teaching Orthopedic Physical Therapy Award. With this Award, Dr. Ron Andrews joins a distinguished group of faculty and clinical mentors in orthopaedic physical therapy.



ROSE EXCELLENCE IN RESEARCH AWARD

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

The recipient of the 2010 Rose Excellence in Research Award is **Dr. Michael "Mike" J. Walker, PT, DSc, OCS, FAAOMPT**, for the manuscript entitled: "The effectiveness of manual physical therapy and exercise for mechanical neck pain: a randomized clinical trial. *Spine*. 2008;33(22):2371-2381.

Dr. Michael Walker is a physical therapist in the United States Army and a proud member of this service for the past 25 years. He is currently deployed overseas and serves as the Chief of Rehabilitation at Camp Cropper, Baghdad, Iraq. He is also the Deputy Director and an Assistant Professor for the U.S. Army-Baylor University Doctoral Program in Physical Therapy at Fort Sam Houston, TX. His teaching emphasis for this program and various continuing education courses include the orthopaedic manual physical therapy examination and treatment of musculoskeletal disorders within the spine and extremities. His research emphasis focuses on the clinical effectiveness of manual

2010 CSM AWARD WINNERS

physical therapy and exercise for musculoskeletal disorders, with an emphasis on the cervicothoracic spine.

Michael received his Bachelor of Science in Microbiology from Northern Arizona University in 1984, and his entry-level Masters degree in Physical Therapy from the US Army-Baylor University Graduate Program in Physical Therapy in 1995. He completed doctoral fellowship training and received his Doctor of Science in Physical Therapy from the US Army-Baylor University Postprofessional Doctoral Program in Orthopaedic and Manual Physical Therapy in 2002. He is an APTA board certified orthopaedic specialist and a Fellow in the American Academy of Orthopaedic Manual Physical Therapists.



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 fifteen years and have positively and substantially affected the shape, scope, and quality of orthopaedic physical therapy practice.

The recipient of the 2010 Richard W. Bowling – Richard E. Erhard Orthopaedic Clinical Practice Award is **Anthony Delitto, PT, PhD, FAPTA**. Dr. Delitto has positively and substantially affected the shape, scope, and quality of orthopaedic physical therapy through his clinical practice, education, and research activities.

Having started his physical therapy career over thirty years ago, Dr. Delitto has been a proponent of using clinical and process outcomes data to assess the effectiveness of care provided by physical therapists. He currently is Professor and Chair of the Department of Physical Therapy, Director of the Comprehensive Spine Center, and Associate Dean of Research at the University of Pittsburgh. Although Dr. Delitto has made numerous contributions to clinical practice, his most notable effort was the work he did with Rick Bowling and Dick Erhard to develop, validate, and refine the treatment-based classification system for low back pain. The use of the treatment-based classification system has revolutionized the care provided to back pain patients by physical therapists both nationally and internationally. In addition, he has also made significant contributions to the education of

doctor of physical therapy students by serving as a strong advocate for the teaching of spinal manipulation at the entry-level. Just as impressive is the list of the advanced doctoral students he has trained, who have gone on to have productive research agendas that have substantially impacted the practice of orthopaedic physical therapy.

Dr. Delitto has influenced countless numbers of physical therapists through his activities associated with the physical therapy profession. He has held a number of committee positions within the association, including the Advisory Panel on Education as well as Chair of the Scientific Advisory Committee for the Foundation for Physical Therapy. His peers have recognized him through the awarding of numerous honors including: the Lucy Blair Service Award, the Marian Williams Research Award, the John H. P. Maley Award, the Golden Pen Award, the Steven J. Rose Award (a recipient six times), and the Mary McMillan Lectureship. He has also a Catherine Worthingham Fellow of the APTA.

In recognition of his consistent and sustained contributions to orthopaedic physical therapy clinical practice over the past 30 years, the Orthopaedic Section recognizes Anthony Delitto, PT, PhD, FAPTA, as the recipient of the 2010 Richard W. Bowling – Richard E. Erhard Orthopaedic Clinical Practice Award.



THE PARIS DISTINGUISHED SERVICE AWARD

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

The Orthopaedic Section's Paris Distinguished Service Award for 2010 is being presented to **Daniel L. Riddle, PT, PhD, FAPTA**. Dr. Riddle currently serves as the Otto D. Payton Professor of Physical Therapy as well as Assistant Chair in the Department of Physical Therapy at Virginia Commonwealth University.

Dan has served the Orthopaedic Section with distinction

in various capacities beginning in 1986. He first served the Section as a member of the Finance Committee for four years and was then chosen in 1989 to serve as a member of the Research Committee. In 1990, he was appointed as the Chair of the Research Committee and held that position for nine years. During his tenure as the Chair of the Research Committee, Dan was instrumental in developing the Section's platform and poster programming at the annual Combined Sections Meeting as well as the Section's Clinical Research Grant Program. The development of the Clinical Research Grant Program has played a key role in providing a source of external grant funding for young investigators conducting orthopaedic clinical research. In developing these programs, Dan created the guidelines and procedures necessary to ensure the continued success of these critical Section activities. It is also important to note that during this period, Dan was instrumental in fostering new Section members as they developed their research agendas that continue today. After completing his term as Chair of the Research Committee, Dan has continued to serve the orthopaedic community and the profession as a member of the Board of Trustees as well as the Scientific Advisory Board for the Foundation of Physical Therapy and also serves as the Deputy Editor of *Physical Therapy*.

In addition to his outstanding record of Section service, Dan also has a distinguished record of contributions that have significantly added to the orthopaedic physical therapy body of knowledge. He has published over 60 peer-reviewed publications and has become internationally recognized for his expertise in clinical outcome measures used to assess patients with musculoskeletal disorders. As a result of his work, Dan has not only been invited to present at numerous international conferences on the subject of his research, but has also received several professional awards including the Helen Hislop Award for Outstanding Contributions to the Profession, the Section's Rose Excellence in Research Award, the Jack Walker Chattanooga Research Award, the Silver Quill Award, and the Dorothy Briggs Memorial Scientific Inquiry Award.

In recognition of Dr. Riddle's long history of outstanding service and exceptional contributions to not only the Orthopaedic Section but the entire profession of Physical Therapy, it is most appropriate that Daniel Riddle, PT, PhD, FAPTA, receive this prestigious Section Award.

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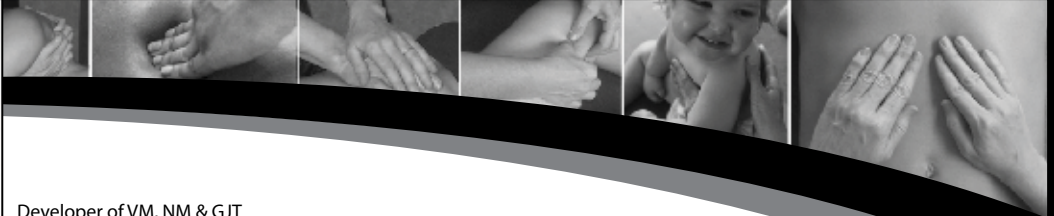
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An integrated approach also requires attention to mechanical relationships between the cranium/spine hard frame to the dura and neural elements. **Neural Manipulation** provides assessment and treatment approaches to address restrictions of the dural and neural components not commonly focused on with musculoskeletal symptoms.

Global Joint Treatment applies an integrative approach to the treatment of joints. It evaluates all aspects of the joint including the nerve, artery, bone, capsule, and ligaments, as well as visceral and emotional connections. It incorporates soft tissue mobilization of the associated bones, while looking at direct and indirect relationships between the bones of the body.

Visceral Manipulation: Organ-Specific Fascial Mobilization; Abdomen 1 (VM1)

- May 13-16 New York, NY
- May 15-18 Palm Beach, FL
- Jun 10-13 Pittsburgh, PA
- Jun 10-13 Burlington, VT
- Jun 10-13 Phoenix, AZ
- Jun 24-27 Chicago, IL
- Jun 24-27 Portland, OR
- Aug 12-15 Washington, DC
- Aug 19-22 St. Louis, MO

Neural Manipulation: Neuromeningeal Manipulation; An Integrative Approach to Trauma (NM1)

- Nov 5-7 Albuquerque, NM

Global Joint Treatment: Upper Body (GJTU)

- Jul 10-12 Palm Beach, FL

Global Joint Treatment: Lower Body (GJTL)

- Jul 15-17 Palm Beach, FL

Global Joint Treatment: Spine (GJTS)

- Jul 23-25 Sedona, AZ
- Jul 29-31 New Orleans, LA

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ORTHOPAEDIC SECTION, APTA, INC.
CSM BOARD OF DIRECTORS MEETING MINUTES
FEBRUARY 18 - 20, 2010

– DRAFT MINUTES –

James Irrgang, President, called a regular meeting of the Board of Directors of the Orthopaedic Section, APTA, Inc. to order at 4:00 p.m. PT on Thursday, February 18, 2010.

Present:

James Irrgang, President
Tom McPoil, Vice President
Steve Clark, Treasurer
Bill O’Grady, Director
Kornelia Kulig, Director
Robert Rowe, Practice Chair
Lori Michener, Research Chair
Beth Jones, Education Chair

Absent:

Aimee Klein, APTA Board Liaison
Tara Fredrickson, Executive Associate
Terri DeFlorian, Executive Director

The meeting agenda was approved with changes.

The February 8, 2010 Board of Directors Conference Call Meeting minutes were approved as printed.

James Irrgang, President, reported there were no items on the consent calendar.

James Irrgang, President, reported the following motions were adopted unanimously via e-mail ~

– **MOTION 1** – James Irrgang, President, moved that the Orthopaedic Section Board of Directors approve funding Joe Donnelly, Incoming Practice Chair, to attend the CSM Board of Directors meetings. ADOPTED (unanimous)

Fiscal Implication: 3 days lodging/meals (3 days x \$320 = \$960)
Airfare (\$470) = \$1,430

Following are the Dates and Times of the Spring 2010 Board of Directors Conference Calls ~

- **Monday, March 8, 2010 ~ 8:00 PM EST**
- **Monday, April 12, 2010 ~ 8:00 PM EST**
- **Monday, May 10, 2010 ~ 8:00 PM EST**

The following items were presented as part of the President’s updates ~

- **Financial Update**

– **MOTION 2** – Steve Clark, Treasurer, moved that the Orthopaedic Section Board of Directors approve transferring \$100,000 from the Sections savings account as follows ~ \$50,000 to the Reserve Fund at LPL Financial Services and \$50,000 to the Research, Education and Practice Endowment Fund at Wells Fargo Advisors. ADOPTED (unanimous)

Fiscal Implication: None

– **MOTION 3** – Steve Clark, Treasurer, moved that the Orthopaedic Section Board of Directors postpone the following 2 motions from the Fall Board of Directors meeting to a July conference call of the 5 elected officers ~

– **MOTION 7** – *The Orthopaedic Section Board of Directors recommends that the Treasurer and President develop a salary schedule for the Orthopaedic Section Executive Director and report back by CSM 2010. ADOPTED (unanimous)*

Fiscal Implication: None

– **MOTION 8** – *The Orthopaedic Section Board of Directors recommends that the Executive Director develop a salary schedule for the Orthopaedic Section employees and report back by CSM 2010. ADOPTED (unanimous)*

Fiscal Implication: None

• Update on Land Offer

Terri DeFlorian, Executive Director, reported that the Section attorney, Greg Bonney, received a letter and sketch drawing from the attorney representing the Diocese on the offer to purchase the Section’s vacant land. The Diocese has an immediate need to build a Medicare Rehabilitation Facility addition to their existing nursing home and stated their proposed special memory care facility would be built contingent on need in the community.

The Board agreed to accept waiving the land use restriction limitation for office use only, which appears in the Diocese’s original counter offer to purchase the property, thus allowing the Diocese to build a building (s) for similar medical usage as the Dioceses current buildings. All other covenants that currently run with the land will remain in place after the sale is final.

In addition, the Board is unclear as to the meaning of a statement the Diocese made that their use of the land “would not be used in any manner that would impair the Orthopaedic Section’s enjoyment of its land” and would like the Diocese to clarify what this means.

The Board of Directors would like Greg Bonney to draft a counter offer to the Diocese incorporating the above decisions. The Board will review the final wording prior to submitting to the Diocese.

Nothing further has been received regarding interest in leasing the vacant first floor office space.

• Web Site Statistics

Tara Fredrickson, Executive Associate and Eric Robertson, Public Relations Chair, reported that the Section averaged 7,600 visitors per month in 2009. The most frequently hit pages were the online store, Independent Study Courses, membership directory, online exam access, ICF guidelines, and OPTP online.

• Federal Advocacy Forum Challenge to Support 1 Student Member

– **MOTION 4** – Tom McPoil, Vice President, moved that the Orthopaedic Section Board of Directors approve funding the PT Student Award winner to the Federal Advocacy Forum in 2010.

– **MOTION TO AMEND** – Robert Rowe, Practice Chair, moved to amend the motion by striking, “funding for PT Student Award winner to” and inserting, “putting out a call for students via Osteo-Blast, Facebook page, etc. to submit proposals with an endorsement by a Section member to attend.” Proposals along with endorsements are to be sent to the Section office. ADOPTED (unanimous)

– **MOTION 4 AS AMENDED** – Tom McPoil, Vice President, moved that the Orthopaedic Section Board of Directors approve putting out a call for students via Osteo-Blast, Facebook page, etc. to submit proposals with an endorsement by a Section member to attend the Federal Advocacy Forum in 2010. Proposals along with endorsements are to be sent to the Section office. ADOPTED (unanimous)

Fiscal Implication: 3 days lodging/meals plus travel = \$1,110

- Foundation Update

Bill Boissonnault, Foundation Board Chair, updated the Board on the grants that have been given out of the Research Grant money the Section has contributed. The total contributions the Section has made to the Foundation are \$900,000.

- APTA Portal to Support Evidenced Based Practice

Jan Reynolds and Tony Delitto gave the Board an overview of what the APTA Portal will look like as well as what the purpose of the portal will be. The portal launch date is scheduled for 2011. APTA is asking the Section to be the first partner since we are farther ahead than other Sections with our clinical guidelines. Right now APTA is looking for Sections to contribute only their expertise. They would like each Section to nominate 2-3 individuals to be liaisons to APTA regarding the portal. The Board agreed to include this as an agenda item on their March conference call.

- AAOMPT Engagement Letter for Physical Therapy Cost Benefit Study

James Irrgang, President, reported that John Childs, Julie Fritz, and Tim Flynn would like to do an original study on the cost benefit of physical therapy for publication in a high impact journal. The Mercer Group would need to be contracted to access data from the claims database since this is not easily navigated by the general public. The Board agreed they need a letter of agreement stating the exact amount of funding they are requesting from the Section. The Board agreed the agreement should contain specific language to ensure the study does not promote any private interests of those heading up the study. Additionally the Orthopaedic Section should be acknowledged as a source of funding of the study in any publication of the results. It is our understanding that the Private Practice Section has already agreed to partially fund this study. James Irrgang will contact John Childs to get a proposal. James Irrgang will discuss this potential partnership with APTA so they are aware of it and bring back for further discussion on the Board's March conference call.

- CSM Agreement

James Irrgang, President, updated the Board on the CSM Agreement discussions. Following are the discussion points ~

1. When figuring the total number of registrants per Section on the points distribution spreadsheet non-APTA members are not

included but students who are members of the Section are included.

2. Revenue from non-Section members is distributed evenly across the Sections. 50% APTA/50% Sections. The Orthopaedic Section received 23% of the revenue.
3. There was consensus at the Sections Presidents Meeting to take a closer look at Option 2 over the next 3 years. (If a member belongs to 3 Sections, each of those 3 Sections would get 1 point on the distribution spreadsheet. As it stands now each of those 3 Sections would get 1/3 point.) Under this option the potential loss of revenue for the Orthopaedic Section could be approximately 3.5%.
4. Developing a tracking system for who is attending each program and tying this into an individual's transcript on the APTA LMC was discussed. James Irrgang will follow up on this with Scott Ward, APTA President, and ask that the APTA Board of Directors look at how to better use technology to track this.
5. As it is now each Section receives a set reimbursement of \$2,000. There was consensus to leave this as is.
6. We will receive updated data in the next couple of weeks which will go to all Sections for review later this spring.

The following reports were given by the Committee Chairs and SIG Presidents. The complete reports can be found on the Orthopaedic Section Web site ~

- Membership

James Spencer, Chair, requested that a reminder of the Return to School Program be sent out in the Osteo-Blast 4x per year. He will communicate with Tara Fredrickson and Tom McPoil on the best timing of this.

- Public Relations/Marketing

Eric Robertson, Chair, reported that he thought the hits to the Section's Web site were low and offered to contact Emilio Rouco in the APTA Public Relations Department regarding the possibility of putting the 15 second ad spots they developed for TV on our Web site to help draw more people in.

- Awards

Tom McPoil, Chair, reviewed the award submission process and the deadlines for this year.

- Nominations

Kelly Fitzgerald, Chair, announced this year's election results and which positions were up for election in 2011.

- Occupational Health SIG

Dee Daley, OHSIG Vice President/Education Chair, highlighted the following activities of the OHSIG ~

1. Their primary initiative continues to be work on a petition for specialization. The petition has been drafted and is being reviewed by board members. To be submitted, a DSP must be included. This is in development with the final section to be drafted at this CSM. Encumbered funds will be used to submit the application in the amount of \$7,500.
2. There has been substantial activity in the SIG regarding content suggestions/comments on physical demand descriptors for the Advisory Panel to Social Security as they look at the disability determination and consider a replacement for the Dictionary of Occupational Titles. A second round of comments has recently been submit-

ted by the SIG after review that included APTA's Practice Department. (The governmental "review periods" are quite rapid for a 500+ page document (physical demand section loosely ¼ of that amount).

3. Work rehabilitation guideline revisions have been delayed by an attempt to redefine the conventional work conditioning/work hardening paradigm with one more suited to the activities therapists perform in the course of work rehabilitation (tentatively conceptualized as levels of "Work Injury Management").

• Foot and Ankle SIG

Steve Paulseth, FASIG President, announced his term ends at this CSM. Clarke Brown will be the new FASIG President. The SIG has established a committee to investigate developing a foot and ankle fellowship.

• Performing Arts SIG

Leigh Roberts, PASIG President, reported the SIG is offering an ISC this year on Physical Therapy for the Performing Artist. They are also involved in 2 major projects -

1. Conducting a membership survey. This project was undertaken in response to the need of finding performing arts PTs out of the area when artists are on tour or travel for training purposes. Information is on the Web site now but profiles need to be updated.
2. Evaluation and treatment protocols are posted to the Web site and available free to members. There is a charge for nonmember access. This project is still in process.

• Pain Management SIG

John Garziona, PMSIG President, reported that the SIG conducted a survey to help them determine if they should pursue a practice analysis. Out of the 300 surveys sent, 43 were completed and returned. Since the response rate was low, the SIG needs to decide where to go from here with the data.

• Animal Rehabilitation SIG

Amie Hesbach, ARSIG President, reported on the legislative luncheon held during CSM. There was a panel of individuals who spoke including representatives from APTA, the ARSIG, a veterinarian, a lobbyist/lawyer, and others. The purpose of the luncheon was to identify changes in legislation, regulation, & reimbursement issues at state and national levels.

• International Classification and Function Guidelines

Joe Godges, ICF Coordinator, reported that the Heel Pain, Neck Pain, and Hip OA guidelines have been accepted to be placed on the National Guidelines Clearinghouse Web site (www.guidelines.gov). An initial draft of The Low Back Pain clinical guidelines was reviewed and edited and is now with the authors to complete. A draft of The Hip Labral Disorders clinical guidelines is written and will be submitted to the ICF practice guidelines coordinator soon.

• Residency and Fellowship Education Committee

Jason Tonley, Residency and Fellowship Coordinator, reported that the Curriculum in a Can program consisting of 5 ISCs is nearing completion. This program was developed to provide the didactic component to residency and fellowship programs not affiliated with an academic institution.

– **MOTION 5** – Tom McPoil, Vice President, moved that the Or-

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thopaedic Section Board of Directors approve the following addition to the SIG and EIG Policies and Rules of Order:

F. SIG and EIG Authority and Limitations:

- iii. Any changes or modifications proposed by the Section Board of Directors to the SIG and EIG Policies and Rules of Order shall be distributed for review and comment by the SIGs and EIGs one month prior to Board vote.

ADOPTED (unanimous)

Fiscal Implication: None

– **MOTION 6** – Robert Rowe, Practice Chair, moved that the Orthopaedic Section Board of Directors to create a policy on a procedure to have an individual removed from office if necessary.

– **MOTION TO SUBSTITUTE** – Robert Rowe, Practice Chair, moved to substitute MOTION 6 with the following, "investigate the feasibility of the Section to discipline a Section member."

ADOPTED (unanimous)

– **MOTION 6 AS SUBSTITUTED** – Robert Rowe, Practice Chair, moved that the Orthopaedic Section Board of Directors investigate the feasibility of the Section to discipline a Section member. ADOPTED (unanimous)

– **MOTION 7** – Tom McPoil, Vice President/ISC Board Liaison, moved that the Orthopaedic Section Board of Directors approve the following ISC topics for publication in 2012 -

1. Foot and Ankle (6 monographs)
2. Osteoarthritis: Linking Basic Science to Intervention (3 monographs)
3. Education and Intervention for Musculoskeletal Injuries: A Biomechanics Approach (6 monographs)

ADOPTED (unanimous)

Fiscal Implication: These courses would be part of the 2012 budget.

– **MOTION 8** – Lori Michenor, Research Chair, moved that the Orthopaedic Section Board of Directors approve the following Foot and Ankle Research Grant, "Effects of anterior to Posterior Talocrural Joint Mobilization in Patients with Subacute Lateral Ankle Sprains." Primary Investigator: Terry Grindstaff, PT, PHD, ATC; Co-Primary Investigator: Jay Hertel, PhD, ATC; Susan Saliba, PT, PhD, ATC; Nicole Cosby, MA, ATC.

Fiscal Implication: \$15,000

JW Matheson, ICF Practice Guidelines Advisory Panel, recommended that the Board of Directors save the \$5,000 allocated at the Fall Board Meeting in 2009 to incorporate video clips into the ICF guidelines online until more money is available to more effectively enhance the guidelines.

The Board of Directors asked Tom McPoil, Vice President, to meet with John Stackpole, APTA Parliamentarian, for clarification of the

Section's election cycle based on the previous bylaw revision. The following election cycle was based on Mr. Stackpole's interpretation of the current Section bylaws:

- President and Director 2 - year one (2010)
- Vice President - year two (2011)
- Treasurer and Director 1 - year three (2012)

In order to bring the current Board of Directors into compliance with this election cycle, the following modifications or changes in term limits were proposed by Mr. Stackpole and accepted by the Board of Directors:

Director 2 - Bill O'Grady was considered implicitly elected for a 3-year term in 2010. If Mr. O'Grady should resign from his position prior to the end of his term, the Board can appoint a Section member in good standing to fill the vacancy based on the bylaws.

Treasurer - the current Section Treasurer, Steven Clark, will have his first term extended by 1 year.

With these modifications and changes in term limits, the Section's election cycle will be brought into compliance with the current Section bylaws. A notice will be published in OPTP explaining these changes and modifications along with the election cycle diagram developed by Mr. Stackpole to determine the appropriate election cycle.

– **MOTION 9** – Steve Clark, Treasurer, moved that the Orthopaedic Section Board of Directors maintain dues at the current rate. ADOPTED (unanimous)

Fiscal Implication: None

Robert Rowe, Practice Chair, reported that there will no longer be a motion on dry needling brought before the House of Delegates in June 2010.

– **MOTION 10** – Tom McPoil, Vice President, moved that the Orthopaedic Section Board of Directors approve providing a DVD with the 2010 skating monograph as long as the University of Delaware signs a copyright release form. The University of Delaware will sell the DVDs for \$1 each. ADOPTED (unanimous)

The Board of Directors discussed plans for the upcoming Fall Meeting in Las Vegas, October 7-9, 2010. It was agreed that everyone will arrive by Wednesday night, October 6th. The meeting will begin first thing Thursday morning, October 7th. Everyone can depart on Saturday afternoon, October 9th.

The following items were unanimously postponed to a future Board of Directors meeting –

- APTA Legislative Alert – Practice Chair
(How to best alert our Chapter Liaisons regarding the potential for pro-POPTS activity involving state PT Boards)
- Advocacy Forum for State Liaison Network – Practice Chair
- Revisit the Section taking back CSM preconference course registrations from APTA – Beth Jones, Education Chair (March 2010)
- International Summit Meeting – Aimee Klein, APTA Board Liaison (March 2010)

The meeting adjourned at 11:05 a.m. PT, February 20, 2010

Submitted by Terri DeFlorian, Executive Director

ORTHOPAEDIC SECTION, APTA, INC.

CSM 2010 ANNUAL - MEMBERSHIP MEETING MINUTES SAN DIEGO, CALIFORNIA – FEBRUARY 19, 2010

– DRAFT –

I. CALL TO ORDER AND WELCOME

- A. James Irrgang, PT, PhD, ATC, FAPTA, President, called the meeting to order at 6:30 p.m.
- B. Past Orthopaedic Section President's, newly certified orthopaedic specialists and all certified orthopaedic specialists, Orthopaedic Section Mentors, Chapter Liaisons to the Section, the Section Board of Directors, Committee Chairs and Section office staff were introduced.
- C. A moment of silence was held for physical therapists that have passed away in the last year.
- D. The agenda was approved as printed.
- E. The Annual Membership Meeting minutes from CSM in Las Vegas, Nevada on February 11, 2009 were approved as printed in Volume 21:1:09 issue of Orthopaedic Physical Therapy Practice.
- F. Orthopaedic Section Election Results – Nominating Committee Chair, G. Kelly Fitzgerald, PT, PhD, OCS

For the Fall 2010 election, there were 898 ballots cast. The number of valid ballots was 890 and the number of invalid ballots was 8. The following positions were elected: President, James Irrgang, PT, PhD, ATC, FAPTA and Nominating Committee Member, Robert DuVall, PT, DHSc, MMSc, OCS, SCS, ATC, FAAOMPT.

There was a call for nominations from the floor for the 2011 election for the positions of Vice President, Director, and Nominating Committee Member. No nominations were brought forth for any of these positions.

The deadline for accepting nominations for the Fall 2010 election is September 1, 2010.

II. INVITED GUESTS

- A. JOSPT President, David Greathouse, PT, PHD, ECS, FAPTA, presented a summary of the JOSPT including the number of submissions and papers accepted for publication. Upcoming special issues on the shoulder (February) and cervical spine (May) are planned. Guy Simoneau, JOSPT Editor-in-Chief, has signed on for another 2-year term.

B. Susan Appling, PT, PhD, OCS, PT-PAC Trustee, gave an update on the PT-PAC fundraising efforts. Susan explained that members cannot make contributions directly to the candidates but they can make contributions to the PT-PAC who can then contribute to the candidates.

C. Dan Riddle, Foundation for Physical Therapy Board of Trustees, on behalf of the Foundation, thanked and acknowledged the Orthopaedic Section for its long-standing support and leadership. The Section has donated over \$900,000 to the Foundation since 1996.

As part of the Foundation's 2007 Capital Campaign, Destination: Research Excellence, the Orthopaedic Section established an endowment for orthopaedic-related research. Section members can contribute research dollars specifically earmarked for this endowment--either by sending checks to the Foundation for Physical Therapy (attention orthopaedic endowment) or donating through the Foundation's Web site.

Visit the Foundation's Web site for updates on current research initiatives and information on scholarships, fellowships, and grants.

III. FINANCE REPORT

A brief synopsis of the Section's Finances can be found on the Section's Web site.

IV. SECTION INITIATIVES

A. 2010-2014 Strategic Plan – James Irrgang, President

A survey was sent to the Section membership to gather information for the Board of Directors to use in preparing the 2010-2014 Strategic Plan. Following are the Strategic Outcomes and Objectives-

MISSION

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

LONG-RANGE VISION

The Orthopaedic Section will be the source for the orthopaedic physical therapist.

STRATEGIC OUTCOMES

Standards of Practice

Education/Professional Development

Public Identity & Promotion of Physical Therapy

Research

Advocacy

STRATEGIC OUTCOMES WITH OBJECTIVES

Standards of Practice

Support development & dissemination of outcome studies in peer reviewed journals that describe the provision of orthopaedic physical therapy consistent with current standards of practice.

- **Objective A**

Prior to 2015, 15 ICF-based clinical practice guidelines for common musculoskeletal conditions will be included in the AHRQ's National Guideline Clearinghouse.

- **Objective B**

Develop national orthopaedic PT outcomes database.

Education/Professional Development

Increase the breath & variety of educational & professional opportunities.

- **Objective A**

Assess possible emerging practice opportunities & if identified provide educational resources.

- **Objective B**

Assess need for resources to enhance psychomotor & clinical decision making skills for orthopaedic PTs.

- **Objective C**

Incorporate use of electronic multi-media in OPTP & ISCs.

- **Objective D**

Create mechanisms for recognition in subspecialization within orthopaedic physical therapy.

- **Objective E**

Promote advancement & development of residency & fellowship programs.

Public Identity & Promotion of PT

Orthopaedic PTs, recognized as experts of movement & musculoskeletal care, will realize increased utilization & recognition by consumers & professional groups.

- **Objective A**

PTs will increase their role as unrestricted direct access providers of musculoskeletal care throughout the United States by 2015.

- **Objective B**

Develop alliances with a minimum of 5 professional organizations to work towards the mutual goal of promoting musculoskeletal care by 2015.

- **Objective C**

Increase Section internet presence to improve branding and promotion of the profession by 2015.

Research

Provide resources & support for conducting laboratory & clinical studies to expand the knowledge base for orthopaedic PT & improve patient management.

- **Objective A**

Establish a clinical research network to support multi-center orthopaedic physical therapy research.

- **Objective B**

Improve orthopaedic PTs ability to translate & apply evidence into practice.

Advocacy

The Orthopaedic PT will be a portal into the health care system and be recognized by society as a specialist for the management of individuals with musculoskeletal conditions.

- **Objective A**

Serve as a resource to APTA & State Chapters to strengthen efforts to increase unrestricted direct access to physical therapists.

- **Objective B**

Serve as a resource to enhance reimbursement for services provided by orthopaedic PTs.

- **Objective C**

Improve communication & advocacy efforts between the Orthopaedic Section and State Chapters.

B. ICF Guidelines – Joe Godges, Coordinator

The potential benefit of the ICF-based Clinical Practice

myopain seminars

**Jan Dommerholt PT, DPT, MPS
& Robert Gerwin, MD**

The course was amazing. I am excited by the wealth of information presented. Thank you for being the second generation and the current reigning explorers in the field of myofascial pain.

Steve Pertes, PT, Lc Ac

● **Foundations of Trigger Point Examination and Treatment**
February 19-21, 2010 (Bethesda, MD)
May 29-30, 2010 (Parma, Italy)

● **Head / Neck / Shoulder Pain**
January 15-17, 2010 (Bethesda, MD)

● **Low Back and Pelvis Pain**
January 28-30, 2010 (Atlanta, GA)
March 12-14, 2010 (Bethesda, MD)
November 20-21 (Parma, Italy)

● **Extremity Pain**
March 25-27, 2010 (Atlanta, GA)
April 16-18, 2010 (Bethesda, MD)

● **Intramuscular Manual Therapy**
May 5-9, 2010 (Atlanta, GA)
May 12-16, 2010 (Bethesda, MD)

Other Courses Available in the Netherlands, Ireland, Israel, Spain

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www.myopainseminars.com
info@myopainseminars.com (email)
301.656.0220 (phone) 301.654.0333 (fax)
7830 Old Georgetown Road, Suite C-15
Bethesda, MD 20814-2440

The Janet G. Travell, MD Seminar SeriesSM

Guidelines Project is to describe the best practice for common musculoskeletal disorders for both physical therapists and non-PT stakeholders.

The Heel Pain, Neck Pain, and Hip OA guidelines have been accepted to be placed on the National Guidelines Clearinghouse Web site (www.guidelines.gov). An initial draft of The Low Back Pain clinical guidelines was reviewed and edited and is now with the authors to complete. A draft of The Hip Labral Disorders clinical guidelines is written and will be submitted to the ICF practice guidelines coordinator soon. Other future guidelines include -

- Patellofemoral Pain
- Knee Osteoarthritis
- Shoulder Adhesive Capsulitis
- Shoulder Instability
- Shoulder Rotator Cuff Syndrome
- Elbow Epicondylitis
- Carpal Tunnel Syndrome
- Lateral Ankle Sprain

D. Residency and Fellowship Education Committee – Jason Tonley, Coordinator

The Curriculum in a Can program consisting of 5 ISCs is nearing completion. This program was developed to provide the didactic component to residency and fellowship programs not affiliated with an academic institution.

Programming is being developed for residency and fellowship faculty on all aspects of Residency and Fellowship education during APTA Annual Conference 2010.

Performing Arts (PASIG) ISCs are currently being written to support the development of a Performing Arts Fellowship.

A train the trainer course is being created to facilitate the education of residency and fellowship mentors. The focus of this course is to equip physical therapy clinical supervisors with the skills to mentor the development of student interns, clinical residents, and clinical fellows toward clinical mastery of orthopaedic physical therapy and related content areas such as manual therapy, movement sciences, sports rehabilitation, spine rehabilitation, and hand therapy. The course will be submitted as a preconference for CSM 2011.

V. RECOGNITION OF BOARD OF DIRECTORS

The following outgoing officers were recognized for their service to the Section as their terms end at the close of the 2010 CSM Membership Meeting –

- Robert Rowe, PT, DMT, MHS, FAAOMPT – Practice Chair
- G. Kelly Fitzgerald, PT, PhD, OCS – Nominating Committee Chair
- Tara Jo Manal, PT, DPT, OCS, SCS - Residency and Fellowship Education Coordinator

The following incoming officers were recognized –

- Jennifer Gamboa, PT, DPT, OCS – Nominating Committee Chair

VI. NEW BUSINESS MOTIONS

No new business was brought forth from the floor.

Board of Director, Committee Chair, SIG, ICF, and residency reports are located on the Orthopaedic Section Web site (www.orthopt.org).

ADJOURNMENT

7:30 PM

OCCUPATIONAL HEALTH

SPECIAL INTEREST GROUP

PRESIDENT'S MESSAGE

GREETINGS OHSIG MEMBERS!

Combined Sections Meeting February 16-20 in San Diego was energizing and full of networking and educational opportunities! OHSIG educational programming took place, the OHSIG Board met, and the OHSIG general business meeting was held. A few updates for you include:

Introducing New Officers

Margot Miller - President

Perry Brubaker - Nominating Committee Member

Thank You Bill O'Grady!

The OHSIG BOD would like to thank Bill O'Grady for serving as OHSIG Interim President this past year. His support, along with that of the Orthopaedic Section Board has been very much appreciated. Bill, thank you for your efforts!

Current OHSIG Officers

Margot Miller – President

Dee Daley – Vice President/Education Chair

John Lowe – Nominating Committee Chair

Perry Brubaker – Nominating Committee Member

Membership Chair – Drew Bossen

Practice and Payor Relations – Rick Wickstrom

CSM Programming: Functional Testing Update - Work Injury Management & Prevention

Thank you to Gwen Simons for facilitating and presenting the OHSIG programming that took place at CSM. Presenters included Gwen Simons, Margot Miller, Rick Wickstrom, and Drew Bossen. Information focused on the current FCE Guidelines, case study examples for return to work and screening, legal issues with FCEs, and post offer screenings. Many great questions and insights related to providing these services.

Petition for Specialization in Occupational Health PT

The petition is nearly completed and attendees at our CSM business meeting were able to scan the draft document. Dee Daley leads the efforts along with the entire BOD. We will keep you posted on the submission and progress of the petition.

Defensible Documentation

John Lowe and his committee are working with APTA on Defensible Documentation. The information is anticipated to be part of the APTA Web site late summer/early fall, similar to other focused practice materials already posted.

Guidelines Update

Work Rehabilitation Guideline revision is in process, and should be available soon. Watch for it. Other guidelines will be revised in 2010/2011, including Ergonomic and Legal.

Occupational Informational Development Advisory Panel (OIDAP)

Rick Wickstrom and Margot Miller have participated in conference calls for OIDAP. OID will replace the Dictionary of Occupational Titles. Our input has been in the area of physical demands. More to follow.

Need Authors

If you are interested in submitting an article for OPTP, please let us know. You can talk with any one of the OHSIG BOD members.

Member Involvement

Our goal for this year is to increase the opportunity for member involvement in OHSIG activities. We believe we are stronger through member involvement. We look forward to working with more of you this coming year!

*Professional Regards,
Margot Miller PT
OHSIG President*

The WOW Factor: Workplaces Optimizing Wellness

By Dee Daley, DPT, PT

Occupational Health Specialist, WorkWell Systems Inc,
Pinehurst, NC – ddaley@workwell.com

Workplace wellness is a promising practice area for physical therapists. Worksite related interventions are an optimal way to reach an extensive population of working age adults. In addition to improving the health of the worker and reducing morbidity and mortality, these programs also can improve workplace health care costs and productivity. Although program adoption has primarily been initiated by larger employers or “early adopters,” there is still significant opportunity for more extensive implementation of these programs and additional potential in smaller businesses. While research is still emerging on best practices in this area, physical therapists are well prepared to be primary stakeholders in work related health and prevention initiatives, with more and more therapists working onsite, strategically partnering with employers or consulting in the field of occupational health.

Evolving literature on worker health, health risks, and the associated impact on health indicates problems including chronic illness, morbidity and mortality, increased health care costs, decreased productivity, disability, and reduced quality of work. The prevalence of employee health risks has been studied by Anderson,¹ including poor exercise in 32.4% of workers, high cholesterol 18.8%, and high stress 18.8%. Findings

Occupational Health Special Interest Group Strategic Plan 2010-2013

| | |
|----------|--|
| 1 | Promote and support evidence-based practice in occupational health physical therapy including research, clinical judgment, and patient/client needs |
| 1A | Disseminate information of occupational health related evidence-based practice in physical therapy |
| 1B | Solicit manuscripts for OPTP |
| 1C | Provide consultation on evidence-based practice in occupational health physical therapy |
| 1D | Promote and support writing and dissemination of case reports in the practice of occupational health physical therapy |
| 1E | Explore voluntary clinic certification based on EBP guidelines/standards set by the SIG |
| 2 | Promote the occupational health physical therapist as the practitioner of choice for illness and injuries that impact worker health and performance |
| 2A | Establish and maintain liaison/relationships with state chapters (and ortho section) to share guidelines and other information |
| 2B | Promote and update occupational health guidelines and position statements |
| 2C | Promote occupational health branding |
| 2D | Present on occupational health related topics and payor forums (when scheduled) |
| 2E | Improve search capabilities to identify occupational health physical therapists (internally within ortho/APTA and to external stakeholders) |
| 3 | Facilitate professional development and specialization in occupational health physical therapy |
| 3A | Pursue specialization status for occupational Health through ABPTS petition |
| 3B | Develop infrastructure for testing/examination and test review materials |
| 3C | Provide educational sessions at CSM |
| 3D | Provide targeted educational programming to support member needs and professional development outside of CSM |
| 3E | Develop/promote residency or fellowship program |
| 4 | Advance, promote, and advocate for the practice of occupational health physical therapy |
| 4A | Serve as a resource to chapters & APTA on issues related to legislation and payment policy |
| 4B | Serve as content expert for external groups |
| 4C | Serve as a content expert on occupational health for education/professional degree programs |
| 4D | Support initiative to form a subgroup on occupational health within the WCPT |
| 5 | Develop a process to understand and meet the needs of our members while growing membership and attracting active OHSIG participants in volunteer/leadership roles |
| 5A | Increase membership 20% by 2012 |
| 5B | Increase active participation & leadership in committees & special projects |

on the effect of risk factors and health care costs have also been identified with 25% of total health expenditures associated with 4 high risk factors in workers including stress, tobacco use, overweight, and lack of exercise. A direct relationship was found between “level of worker risk” and “subsequent cost.” These risk factors are largely modifiable through behavior and lifestyle modification.

Research related to workers in industrial settings reveals the proportion of overweight industrial workers is more than 25% higher than the general population, with between 20% and 37% of industrial workers meeting the clinical definition of obesity.^{1,2} More than one-third of obese employees have 3 to 4 other risk factors, which is more than double the number for normal BMI individuals.³

Work absence and disability data is important considering the forecasted loss of workers over the next 10 to 20 years as baby boomers age and retire. Individuals who have limited work ability or are not working can impact overall workplace productivity. Absence and disability encompasses almost 30% of productivity and health expenses related to physical health.⁴ Pronk identified an improvement in lifestyle related modifiable health risks including physical activity and cardiovascular fitness as a result of workplace wellness.⁵ Higher levels of physical activity were associated with higher work quality and performance, while higher levels of fitness related to higher quality of work.

The workplace is becoming an attractive way to reach high numbers of individuals in a common setting. Another

benefit of this approach is expanded focus from wellness as an individually targeted intervention to one including ecological/social components that may also need to be considered for long-term program viability and success.⁶ Worksite wellness programs may help decrease socioeconomic and access barriers that have been identified as obstacles to long-term fitness program success.⁶ Integrating physical activity into the workplace/workday expands the possibility for self efficacy and social support, both important elements of change. A large 5-year study of employees in auto manufacturing demonstrated a comprehensive wellness program was able to impact nearly half the health risks, moving many participants to a low risk status in under a year.⁷

PROGRAMMING OPTIONS

Exercise and physical activity strategies in the workplace can vary widely and include self directed/structured, formal rote/activity based, solo/group, onsite activity during work hours/personal time/during breaks or lunch, etc. Although some workplace programs are developed and implemented with employers, literature shows there may be additional stakeholder buy in and better results using a participatory approach, where worker/team member priorities and choices are solicited and subsequently championed by the front line personnel. Fitness/wellness programs seem to show evidence for increases in physical activity when pursued for a minimum of 12 to 24 weeks.⁸

Traditional structured exercise options could include aerobics and conditioning, group fitness breaks, and exercise breaks at meetings or lunch, ranging from 10 to 30 minute intervals.

Supervised moderate to high intensity exercise either onsite or in conjunction with negotiated programs at a local health facility can also improve worker physical activity.⁹ Simple aerobic activity suitable for sedentary adults in street clothes could be administered with trained facilitators for short periods, and high participation has been noted in at least one program.⁶ Varied activity times seem to be a factor in meeting the varied schedules of workers.¹⁰ Yancey⁶ and Sorenson¹¹ both note that long-term adherence may result from first assessing exercise options and needs including facilities (onsite, community), discounts, and decision points for policies and procedures for health choices.

Semistructured or unstructured programs can take various forms. Informal programs have shown success including rote activity or purposeful activity such as housework or play activity. Offerings of unsupervised self paced exercise programs could include walking/pedometer or weekly exercise programs with self aerobics for 30 minutes 3 times a week.^{11,12} This information supports the philosophy that exercise programs need not be formal or structured. Walking trails, tracks, or painted lines could also be used at some facilities to promote simple onsite activity.¹³ Campaigns such as “10K a day” (10,000 steps measured on a pedometer) can also be used to increase awareness and activity as part of walking programs.¹³

Use of a participatory approach to wellness/fitness with advisory or steering committees and lay coaches is an area of current investigation that appears to have some promising results. These groups help identify workplace needs and goals,

LEARN MORE ABOUT WORKPLACE WELLNESS AND WELLNESS PROGRAMS USED IN THE WORKPLACE

American Heart Association – Heart at Work program (has become Start! – in the Workplace)
http://startwalkingnow.org/start_workplace.jsp

Physical Activity Evaluation Handbook
<http://www.cdc.gov/nccdphp/dnpa/physical/handbook/pdf/handbook.pdf>

WELCOA- Creating Well Workplaces
<http://welcoa.org/wellworkplace/>

NIOSH Steps to a Healthier US Workforce Initiative
<http://www.cdc.gov/niosh/worklife/default.html>
Publication page
<http://www.healthierus.gov/steps/documents.html>

Center for Research on Occupational and Environmental Toxicology
Health and Safety Programs- Wellness and Health Promotion
<http://www.croetweb.com/links.cfm?subtopicID=733>

Health Works for Women
<https://healthworksforwomen.org/home.jsp>

Coronary Health Improvement Program (CHIP)
<http://www.chipusa.org/>
http://www.chiphealth.com/director_resources/resources.php

Get Fit on Route 66
<http://aarp.getfitonroute66.com/>
<http://www.hesonline.com/ProductDetails.aspx?ProdID=26>

National Coalition for a Healthy America
http://www.forahealthyamerica.org/corporate_program.asp

International Physical Activity Questionnaire
<http://www.ipaq.ki.se./ipaq.htm>
http://www.calwic.org/docs/wwt/walk_activity_questionnaire.pdf
<http://journals.cambridge.org/action/displayFulltext?type=1&fid=633884&jid=PHN&volumeId=9&issueId=06&aid=587020>

Manitoba Cancer Prevention
Overview of Live for Life, /working Healthy Project, Walk In to Work Out, PACE
http://www.cancer.ca/Manitoba/Prevention/MB-Knowledge%20Exchange%20Network/~media/CCS/Manitoba/Files%20List/English%20files%20heading/pdf%20not%20in%20publications%20section/KEN%20-%20Adults%20Workplace%20Physical%20Activity_567321668.ashx

BHF National Centre Physical Activity and Health- Previous Evaluation projects and reports
<http://www.bhfactive.org.uk/evaluation/previousprojects.html>
Workplace
<http://www.bhfactive.org.uk/workplace/index.html>

Diabetes Prevention Program
<http://diabetes.niddk.nih.gov/dm/pubs/preventionprogram/>
<http://care.diabetesjournals.org/content/25/12/2165.abstract>

LifeSteps (UAW/GM)
www.lifesteps.com
<http://healthproject.stanford.edu/koop/UAWGM/pdf/Documentation.pdf>

at least at a formative level, to help maximize participation and negotiate optimal resource use in the workplace/community. Employee advisory boards/steering committees can include representatives from management and labor, multidimensional ethnic groups, and workers from various shifts.^{14,15} Volunteer lay coaches receive training in various program elements to help increase support and encourage participation. Lay coaches could also help distribute suitable education materials and help direct individuals with questions to the therapist. Based on worker demographics, these individuals could also help tailor and distribute education for workers/families, and literacy appropriate/translated educational/promotional materials.^{6,11}

ASSESSMENT AND OUTCOMES

Assessment strategies for measuring physical activity and associated physiologic status or changes in worker health include information on the amount and type of physical activity, biometric data, and health risk assessments. Biometric data including blood pressure and body weight/height/BMI are basic physical measures that are related to physical activity.³ In addition to monitoring vital signs to ensure safety to participate in physical activity, body weight and BMI are indicators of several risk factors including cardiovascular disease and diabetes.¹⁰

Health risk assessments (HRAs) are widely used and relatively low cost self report questionnaires that assess health status and practice, estimate health risk, and allow for targeted prevention and educational messages.^{16,17} Health risk assessments have demonstrated reliability and validity through health care expenditures and mortality related research.^{1,16,18} Specific health risk information and health measures can be drawn from HRAs in addition to shorter IPAQ questionnaires.^{5,11,19} The International Physical Activity Questionnaire from WHO/CDC⁷ includes days and minutes of activity over the past week measured in at least 10 minute increments for categories such as vigorous, moderate activity, work related and leisure, television/computer time.^{7,11,18}

Program costs can be evaluated by the employer/therapist, with preset cost estimates determined/agreed upon by the employer and physical therapist prior to implementing interventions. Information would be shared relating to equipment/human costs and the "costs avoided," as determined by lower health risk on HRA, actual medical costs (and/or percentage change in participants/nonparticipants). "Days away from work" are also measurable data points that can be obtained from an employer to evaluate work productivity in a simple manner. While program costs and cost benefit information are largely desirable from an employer's perspective, it is often difficult to obtain specific costs and operational definitions of volunteer time, social support, health care "costs," and the value of "absence."

CONCLUSION

While 95% of employers have reported offering one or more health promotion activities as early as 1999, comprehensive change and integrated planning in employee health continues to be limited, especially in the area of lifestyle and behavioral risks.²⁰ Physical therapists are uniquely qualified to strategically partner with employers to consult or to help administer health and wellness programs, especially considering worker co-morbidities and chronic conditions that can increase costs and complicate progress in achieving a healthy workforce.

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KAISER PERMANENTE

FOOT & ANKLE

SPECIAL INTEREST GROUP

FASIG STEPS AHEAD!

The Foot/Ankle Special Interest Group continues to make strides in 2010, focusing on foot/ankle-specific activities, exciting clinical and academic projects, and even fostering research with its own funds. A long-time leader in the propagation of lower extremity treatment and evaluation strategies, the FASIG used the Combined Section Meetings in San Diego to show the entire Orthopaedic Section membership that not only will the FASIG continue to address the informational needs of both instructor and clinician, but the FASIG will renew its commitment to insuring that the consumers of foot and ankle care recognize the physical therapist as a first choice in getting back on their feet!

FASIG is Driving Research

During the annual FASIG business meeting in February, FASIG President, Steve Paulseth, PT, DPT, proudly announced the recipients of a \$15,000 research grant (funded by FASIG) entitled “The Effects of AP Talocrural Joint Mobilization in Patients with Subacute Ankle Sprains,” to be completed by University of Virginia researchers including Terry Grindstaff, J Hertel, S Saliba, N Crosby. “We are pleased to spearhead research in an area so important to us,” says Steve. “We’ve worked hard to get into a position to do this and this grant speaks volumes about our dedication to foot/ankle study. Our membership can be proud of their leadership role.”

FASIG is Driving Continuing Education

FASIG Vice President and Director of Programming, RobRoy Martin, PT, PhD, moderated an impressive and thought-provoking 3-hour session at CSM 2010 regarding repetitive use syndromes involving the foot/ankle. Glenn Pfeffer, MD, and Joshua Bailey, PT, DPT, CSCS, OCS, combined to offer the overflowing audience a complete review of several challenging syndromes, pointing to new research along the way. Dr. Pfeffer was particularly engaging, applying both critical and complimentary commentary about the role of the PT profession in comprehensive orthopaedic management. Dr. Bailey conferred with Dr. Pfeffer while answering many questions from the audience. Dr. Martin was especially pleased by the “standing room only” crowd.

The Foot/Ankle Fellowship

The FASIG continues to comply with the strategic plan of the Orthopaedic Section by progression toward a full-fledged fellowship for the Foot and Ankle. Perhaps no other issue will define the growth of our SIG more than this undertaking. The fellowship process appears daunting, yet much has already been completed. The end result is a duly-certified specialist who deserves recognition in the eyes of consumers, payors, peers, and physicians, and who, by result of hundreds of hours of continuing education and practice specific to the foot and ankle, should be the practitioner of choice for foot/ankle dysfunctions. The moniker should be a “status symbol,” directing patients to the most capable provider in their community.

FASIG Specialists Discuss Growth: Annual Meeting Overview

The annual business meeting was highlighted by several changes in FASIG leadership, the FASIG annual report, and extensive discussion regarding foot and ankle fellowships, OPTP content, and strategies for growth of the FASIG.

Clarke Brown, PT, DPT, OCS, ATC, was announced as the new FASIG President, replacing Steve Paulseth who completed a maximum of 2 terms. The Orthopaedic Section, represented by Tom McPoil, PT, PhD, presented a certificate of appreciation to Steve. Steve’s unquestionable dedication to the FASIG over the past 6 years is worthy of appreciation. It is hoped that Steve continues his efforts within FASIG.

Nominating Committee Chair, Susan Appling, PT, PhD, announced 2 new nominating committee members--Todd Davenport, PT, DPT, OCS, who was elected to a 3-year term and Joseph Brosky, Jr, PT, MS, SCS, who was elected to a 2-year term.

The 2010 FASIG annual report included information regarding the development of practice standards, which includes an initial survey of entry-level PT programs. Forty-one institutions have responded, representing too few schools for survey conclusion. Therefore, a survey task force including Irene Davis, Stephanie Albin, Rob Martin, and Todd Davenport have consented to assist with this process.

Discussions also included reimbursements for foot orthoses by third party payors. Reimbursement varies from company to company and by state. Generally, even when a company consents to reimburse for the devices, they rarely pay. Thus cash fees apply to most patients. In regards to taping procedures, the following codes have been successful for some with Medicare, Workers Compensation, and a few private carriers.

| HCPSC code | MC allowance | Fee Schedule |
|-------------|--------------|--------------|
| Ankle 29540 | 37.67 | 70 |
| Foot 29550 | 36.52 | 60 |

FASIG is Driving Entry-level Education

The FASIG continues to survey academic PT programs regarding current curricular components specific to the foot and ankle. The FASIG is determined to play a leadership role in the provision of up-to-date information to entry-level physical therapy programs, thereby helping students receive curriculum content that matches each student’s needs for licensure preparation while also meeting the needs of an ever-expanding consumer demand. Surveying current curriculum is the first step.

FASIG Expands Focus

Incoming FASIG President, Clarke Brown, promises a very active agenda for the upcoming business year. “This year is an

important one, for the momentum that has been built must be continued. Naturally, FASIG growth will be directly tied to the involvement of our members.” Dr. Brown, a private practice owner who specializes in treating foot/ankle patients, sees the FASIG as a tool to enhance his practice. “Becoming proficient in treating the foot and ankle requires on-going learning, sharing of clinical expertise, and a network of similarly-focused providers. That is EXACTLY what the FASIG represents.” Dr. Brown also sees opportunity. “That’s opportunity with a large ‘O,’ for the PT who is known for his special interest in foot/ankle dysfunctions is a viable referral for other PTs in his area.” “Our colleagues will refer to us, but we need to let them know we are out there.”

Dr. Brown also envisions the FASIG as a catalyst for:

- Media Materials--items specific to the group to expand practice awareness and continuing ed.
- Fellowships--“The creation of a Foot/Ankle Fellowship is long overdue.”
- Practice Guidelines--the publication of practice standards specific to the foot/ankle.
- Branding Opportunities--the foot/ankle specialist makes direct connections to orthopedists and podiatrists.
- Networking--use social and professional communications to advance group objectives.
- Curriculum Enhancement--foot/ankle specialists make great adjunct professors.
- Speakers Bureau--creation of a FASIG-sponsored speakers list which would be utilized for foot/ankle presentations.

FASIG Needs You! What Can You Do?

Looking to expand your practice for foot/ankle expertise? Consider joining FASIG or share in our collective knowledge via networking. Newsletters, social and professional networking, and branding efforts are all required for our SIG to grow and prosper. Here is your checklist!

- ✓ Go to the “Find a Foot and Ankle PT” on the FASIG web page and complete your demographics.
- ✓ Call or email incoming President, Clarke Brown with ideas, concerns, or questions.
- ✓ Call or email a colleague who treats patients with foot/ankle pathologies and ask him or her to join the FASIG.
- ✓ Join in on the bulletin board and pose your latest clinical question!
- ✓ Contact anyone of our members for more information!

Submitted by Clarke D. Brown,
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CALL FOR CANDIDATES

Dear Orthopaedic Section Members:

The Orthopaedic Section wants you to know of two positions available for service within the Section opening up in February, 2010. If you wish to nominate yourself or someone else, please contact the Nominating Committee Chair, Jennifer Gamboa, at jgamboa@bodydynamicsinc.com. **Deadline for nominations:** September 7, 2010. Elections will be conducted during the month of November.

Open Section Offices:

- **Vice President:** Nominations are now being accepted for election to a three (3) year term beginning at the close of the Orthopaedic Section Business Meeting at CSM 2011.
- **Nominating Committee Member:** Nominations are now being accepted for election to a three (3) year term beginning at the close of the Orthopaedic Section Business Meeting at CSM 2011.

BE SURE TO VISIT

http://www.orthopt.org/policies_and_covers_mbr.php
for more information about
the positions open for election!

PERFORMING ARTS

SPECIAL INTEREST GROUP

SPRING GREETINGS!

I hope this message finds you all recovering from the extreme winter weather. Perhaps you warmed up by the fire watching the Olympics or thawed in San Diego during CSM. The Performing Arts Special Interest Group (PASIG) held our annual business meeting during CSM this year. The minutes of the meeting are included in this newsletter.

I would like to thank our outgoing board members. Sheyi Ojofeitimi served 2 years as Chairperson of the Nominating Committee and also assisted on special projects. Karen Hamill completed 3 years as Secretary. Besides taking minutes, she helped coordinate our OPTP newsletters. Tara Jo Manal served 6 years as Vice President/Education Chair. During her tenure, she coordinated and executed the excellent programming annually for CSM. The structure of the presentations, the quality of the speakers, and the attendance soared under her guidance. Thank you to all for giving of your time and talents to the PASIG!

Congratulations to our newest board members: Lisa Donegan-Shoaf as Vice President/Education Chair, Jason Grandeo as Nominating Committee Chair, and Kendra Hollman-Gage and Laura Becica, both as Nominating Committee members. Contact information for officers and committee chairs are listed at the end of this newsletter.

Please visit our Web site at: http://www.orthopt.org/sig_pa.php. We are working to update our member's profiles to expand the search capability of the Web site. Please update your member profile by clicking on "PASIG Member Profile Update."

*Yours in the arts,
Leigh A. Roberts*



Leigh Roberts presenting the PASIG Student Research Award to Miho Urisaka, University of Southern California, Class of 2009. Dr. Urisaka presented her student research entitled "Is support moment during single-legged hopping influenced by patellar tendinopathy?" at CSM 2010.

PASIG BUSINESS MEETING MINUTES

February 20, 2010

Combined Sections Meeting, San Diego

Meeting began at 7:10 AM PST

Meeting adjourned at 7:50 AM PST

- I. **Approval of Minutes from last meeting.** Shaw motioned for approval and seconded by Tara Jo
- II. **PASIG Board Members**
 - a. Outgoing members received plaques for years of service
 - i. Tara Jo Manal, PT,DPT,OCS,SCS – Vice President
 - ii. Karen Hamill, PT, DPT – Secretary
 - iii. Sheyi Ojofeitimi, PT, MPT – Nominating Committee Chair
 - b. Incoming
 - i. Lisa Donegan Shoaf, PT, PHD – Vice President/Education Committee Chairperson (2011-2014)
 - ii. Laura Becica, PT, DPT – Nominating Committee Member (2011- 2014)
 - iii. Kendra Hollman-Gage, PT, DPT – Nominating Committee Member (2011 - 2013)
- III. **Budget for 2010-**
 - a. Approved by Orthopaedic Section BOD October 2009
 - b. \$2500 total
 - i. \$1000 to support for officers / committee chairs to attend CSM
 - ii. \$500 Web site updates/database
 - iii. \$400 for Student Scholarship
 - iv. \$450 Conference calls
 - v. \$80 Outgoing officer plaques
 - vi. \$70 for President/VP retreat
- IV. **Committee Chairpersons Appointed**
 - a. Scholarship Committee – Amy Humphrey, PT, DPT, OCS
 - b. Nominating Committee - Jason Grandeo, PT, DPT, OCS
 - c. Research Committee – Shaw Bronner, PT, PhD, OCS,
- V. **Committee Reports**
 - a. Scholarship
 - i. 2010 award to Miho Urisaka, PT, DPT who graduated last May from the University of Southern California. Presentation is entitled: IS SUPPORT MOMENT DURING SLOW SINGLE-LEGGED HOPPING INFLUENCED BY PATELLAR TENDINOPATHY?
 - ii. Discussed requirements for receiving a student scholarship
 - b. Nominating Committee
 - i. Offices Open in 2011 – 3-year terms
 1. President
 2. Nominating Committee member at large
 - c. Research Committee

- i. Forty-seven (47) citation Blasts have been e-mailed since June 2005. Topics since CSM 2009: The Foot and Ankle in Performing Artists, Platelet-rich Plasma Therapy, Prolotherapy, Hypermobility, Lateral Epicondylitis, Osteochondritis Dissecans (OCD) of the Talus, Great Toe Sesamoid Injuries, Plantar Plate Disruption, Lisfranc Sprains, Motor Imagery for Enhanced Movement Execution, and Gymnastics. These are also posted on the PASIG Web page. All Blasts are in annotated bibliography format.
- ii. The post-CSM March Citation Blast 2010 will be sent to all Orthopaedic Section members.
- iii. For CSM 2010 we had a total of 7 accepted PA platform and poster presentations. This is up from 6 in '07, and maintained from 7 in '08, and 7 in '09.
- iv. We are not aware of new PA case studies submitted in 2009 to JOSPT or OPTP.
- v. PASIG Research Committee Chair continues to represent the PASIG at DANCE/USA Medical Taskforce meetings and serves as their Secretary and on their Research Committee. DANCE/USA represents professional dance companies in the US and Canada. The Post-hire Dance Screen, developed by the Medical Taskforce, is now used by more than 35 companies. Furthermore, there are 7 dance companies using the Dance/USA screen who are collaborating to analyze data across companies. Future goals are to develop a web-based tracking system that will standardize injury tracking and facilitate further collaboration.
- d. Blast Topics for 2010 – Due to Shaw completing 9 of the 10 Citation Blasts in 2009, PASIG Research Committee continues to look for members to assist in completing Citation Blasts. Shaw is available to assist with mentoring those who need help.
- e. Education
 - i. Monograph entitled “Physical Therapy for the Performing Artist” will be released in September 2010. Topics include Figure Skating, Artistic Gymnastics, and Instrumental Musicians.

VI. Projects

- a. Updated Web site Directory
 - i. Members will be able to fill out more extensive information of their performing arts profile.
 - ii. Members will be able to search by new fields such as city, state, PA patients treated, and other search fields.
 - iii. Need members to update their profile so that these fields will be available for view by Orthopaedic Section members.
- b. PASIG Resource Center
 - i. PASIG has compiled information that may be useful in understanding technical aspects of various performing arts, evaluating and treating performing artists, and managing performing artists rehabilitation.
 - ii. PASIG is seeking help from members in assisting with Resource Center

- iii. This information can be downloaded FREE to PASIG/Orthopaedic Section members, and there will be a FEE to nonmembers.
- iv. Funds from nonmembers will go into PASIG encumbered funds.
- v. Content currently coming from monthly citations blasts, OPTP publication, and we are investigating content and authorship release from CSM/PA monograph.
- vi. This Web site is still in development and will be LIVE ASAP.

VII. Other Business

- a. Beverly Weurding informed attendees of Wheelchair Dancers Organizations that help people in wheelchairs perform Ballroom and Latin Dancing. In San Diego, the number is (619) 905- 8488 and the Web site is www.wheelchairdancers.org in order to learn more.
- b. Gina Pongetti indicated that her organization Neuro-Tour is seeking therapists to help with national touring companies. Her number is (630) 607-8907 and email is: adaggiogymnastics@hotmail.com

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Vice President/Education Chair

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Nominating Committee Chair

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 703-527-9557
 Term: 2010-2011

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- Joint Arthroplasty: Advances in Surgical Management and Rehabilitation (6 monographs)
- Physical Therapy for the Performing Artist (3 monographs)



The Orthopaedic Section will be seeking CEU approval from the following states for the 2010 courses listed above: Nevada, Ohio, Oklahoma, Pennsylvania, and Texas.

Current Courses Available

3-Monograph Courses

- Basic Science for Animal Physical Therapists: Equine, 2nd Edition
- Basic Science for Animal Physical Therapists: Canine, 2nd Edition
- Reimbursement Strategies for Physical Therapists (Limited print quantity available.)
- Diagnostic Imaging in Physical Therapy (Limited print quantity available.)

6-Monograph Courses

- Update on Anterior Cruciate Ligament Injuries
- The Female Athlete Triad
- Orthopaedic Issues and Treatment Strategies for the Pediatric Patient
- Low-back Pain and the Evidence for Effectiveness of Physical Therapy Interventions
- Movement Disorders and Neuromuscular Interventions for the Trunk and Extremities
- Dance Medicine: Strategies for the Prevention and Care of Injuries to Dancers
- Vestibular Rehabilitation, Dizziness, Balance, and Associated Issues in Physical Therapy (Limited print copies available.)
- Pharmacology (Only Available on CD)

12-Monograph Course - Prepare For The OCS Exam!

- Current Concepts of Orthopaedic Physical Therapy, 2nd Edition



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Each independent study course consists of 3, 6, or 12 monographs in a binder along with instructions for completing the final examinations online. If you are unable to complete the final exam online you can request hard-copy materials from the Section office. Monographs are 16 to 28 pages in length and require 4 to 6 hours to complete. Ten multiple-choice review questions are included in each monograph for your self assessment (answers are on the last page). *Current Concepts of Orthopaedic Physical Therapy* consists of case scenarios and multiple-choice questions. The final examination consists of multiple-choice test questions. Exams for 3- and 6-monograph courses must be completed within 3 months. Exams for *Current Concepts of Orthopaedic Physical Therapy* must be completed in 4 months.

Educational Credit

To receive continuing education, registrants must complete the examination and must score 70% or higher on the examination. Registrants who successfully complete the examination will receive a certificate recognizing the contact hours earned.

| Number of monographs per course | Contact hours earned |
|---------------------------------|----------------------|
| 3-monograph course | 15 |
| 6-monograph course | 30 |
| 12-monograph course | 84 |

Only the registrant named will obtain contact hours. No exceptions will be made. Registrants are responsible for applying to their State Licensure Board for CEUs.

Please visit our Web site for additional courses approved by NV, OH, PA, TX, OK, and NATA.

Registration Fees

| | Orthopaedic Section Members | APTA Members | Non-APTA Members |
|---------------------|-----------------------------|--------------|------------------|
| 3-monograph courses | \$100 | \$175 | \$225 |
| 6-monograph courses | \$190 | \$290 | \$365 |
| 12-monograph course | \$290 | \$540 | \$540 |

If notification of cancellation is received in writing prior to the course, the registration fee will be refunded less a 20% administrative fee. No refunds will be given after receipt of course materials.

REGISTRATION FORM

I am registering for course(s) _____

Name _____ Credentials (circle one) PT, PTA, other _____

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Billing Address for Credit Card (if applicable) _____

Daytime Telephone Number (____) _____ APTA# _____ E-mail Address _____

For clarity, enclose a business card.

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Please check:

- Orthopaedic Section Member
- APTA Member
- Non-APTA Member

I wish to join the Orthopaedic Section and take advantage of the membership rate. (Note: must already be a member of APTA.)

- I wish to become a PTA Member (\$30).
- I wish to become a PT Member (\$50).

Fax registration and Visa, MasterCard, American Express, or Discover number to: (608) 788-3965

Visa/MC/AmEx/Discover (circle one)# _____

Expiration Date _____

Signature _____

Registration Fee _____

WI State Sales Tax _____

WI County _____

Membership Fee _____

TOTAL

Where did you hear about the course? Brochure Orthopaedic Section Web site E-mail Other _____

Mail check and registration to: Orthopaedic Section, APTA, 2920 East Avenue South, Suite 200, La Crosse, WI 54601 Toll Free 800-444-3982

PAIN MANAGEMENT

SPECIAL INTEREST GROUP

President's Message

John E. Garzione, PT, DPT, DAAPM

CSM 2010 was again a great success. The only complaint I heard was there was so much great programming and so little time to see it all.

The PMSIG's program entitled "Factors that influence musculoskeletal pain: fatigue, sex, personality, psychology, and genetics" presented by Kathleen Sluka, PhD; Laura Frey-Law, PhD; and Steven George, PhD was well attended and extremely interesting. I again thank these excellent presenters/researchers for their work and their informative presentation which adds to our evidence-based practice.

SURVEY RESULTS

Thirteen percent of our members took the time to answer our online survey. While I was disappointed at the low number of responses, the researchers of the group felt that this was a higher percentage than average for a survey. If you would like a copy of the results, please email me at johngarione@frontiernet.net. I will be happy to provide you with the responses. The most significant results are listed below.

- 37% have an advanced doctorate, 16% BS/BA, 14% entry level doctorate, 12% advanced masters.
- 77% have 11+ years of clinical experience.
- 37% work in an outpatient facility, 23% work in private practice.
- Most respondents were members of other pain organizations and held other advanced certifications.
- 88% felt there was a need to obtain advanced training in pain management physical therapy, 79% were not interested in providing a residency/fellowship in pain management PT, and 61% were not interested in attending a residency/fellowship in pain management PT.
- Most respondents use additional pain descriptor tests in addition to the VAS, and evaluate patient's nutritional, pharmaceutical use, and/or habits.
- Interdisciplinary team approach: 65% use primary care physicians, 63% use pain specialists, 65% do not use OT, 72% do not use massage therapists, 72% do not use acupuncturists, 63% use mental health providers, 72% do not use osteopathic physicians, 77% do not use chiropractors, and 88% do not use naturopathic physicians.
- 55% were most comfortable in referring to other disciplines, 31% were somewhat comfortable.
- 74% have referred patients to a specialty pain clinic with 100% of these were referred to an outpatient facility.

PRACTICE TECHNIQUES:

- 48% felt acupuncture/acupressure was somewhat important
- 51% felt craniosacral therapy as unimportant

- 48% felt energy treatments were unimportant
- 52% felt manipulation/mobilization was very important
- 52% myofascial release was very important
- 33% massage was somewhat important
- 42% traction/decompression was somewhat important
- 41% trigger point therapy was very important
- 33% visceral mobilization was unimportant followed by 31% were neutral
- 40% biofeedback was somewhat important
- 32% high voltage electrical stimulation was unimportant
- 29% iontophoresis was somewhat important and 29% unimportant
- 48% laser was unimportant
- 45% microcurrent was unimportant
- 27% ultrasound was neutral and 27% unimportant
- 81% aerobic exercise was very important
- 50% neutral to Alexander techniques
- 36% somewhat important to Feldenkrais
- 50% very important for functional resistance exercise
- 43% somewhat important for guided imagery
- 48% somewhat important for isometric exercise
- 45% somewhat important and 43% very important for isotonic exercise
- 36% somewhat important for meditation with 29% very important and 26% neutral
- 41% neutral for Pilates, 33% somewhat important
- 50% neutral for Qi Gong
- 60% very important for relaxation
- 43% somewhat important and 38% neutral for Tai Chi
- 50% somewhat important for Yoga
- 88% felt that coping mechanisms were very important
- 60% rated that an enabling environment was very important
- 34% were neutral to race/ethnicity and 32% felt it was somewhat important
- 56% felt a non supportive environment was very important
- 88% felt psychological factors were very important
- 47% felt religious/ spiritual beliefs were somewhat important, 40% felt they were very important
- 49% felt neutral about sex/gender with 29% somewhat neutral
- 81% give recommendations about behavioral cognitive techniques
- 74% suggested dietary/nutritional changes
- 70% gave recommendations about medication benefits, adverse effects, and timing
- 56% gave no recommendations about supplements
- 51% gave recommendations about topical creams and compounds

These results will help guide us to educational topics and continuing education module topics in the future.

**PAIN SIG MEETING MINUTES CSM
2010 SAN DIEGO**

Friday, February 19, 2010

The meeting was called to order at 7:10 a.m. by John Garziona, President.

Bill O’Grady the BOD liaison to the PMSIG attended.

Last year’s minutes were read and approved.

All attendees were again thanked for their involvement with SIG activities over the past year. We can still use more articles for the OP newsletter. These articles can be emailed to johngarziona@frontiernet.net for submission.

The results of the survey were provided. The initial survey to determine if a practice analysis is feasible was completed by 13% of the members. The majority of respondents have their doctorate degree with over 11 years of clinical experience. The majority felt that there was a need to obtain advanced training in Pain Management; however, this majority was not interested in providing a residency/fellowship in Pain Management. Discussion was held and agreement reached that a subspecialty in pain management be offered to our members in the form of home study/internet course modules and a final test leading to a credentialed subspecialist in pain management physical therapy. The modules would be written to present the newest research of pain mechanisms and to focus on the treatment of various conditions such as Fibromyalgia, CRPS, OA, etc. A committee of Kathleen Sluka, Laura Frey-Law, Joel Bialosky, Janice Brown, and John Garziona were charged to find authors or write modules for this upcoming project.

Bernadette Jaros was elected to a 3-year term and Neena Sharma was elected to a 2-year term to the Nominating Committee. The positions of President and Vice President are open for election this year and nominations for these positions should be emailed to either Bernadette or Neena for inclusion on the ballot (bernie.jaros@verizon.net or NSHARMA@kumc.edu).

Marie Hoeger Bement, Vice President of the SIG, attended the Orthopaedic Section’s Fall Meeting in La-Crosse, Wisconsin.

Beth Jones, Education Chair of the Orthopaedic Section, suggested that submitted topics for CSM be titled to attract the attention of the reviewers and prospective attendees.

The meeting was adjourned at 7:50 AM.

*Respectfully submitted,
John E. Garziona, President*



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ANIMAL PHYSICAL THERAPIST

SPECIAL INTEREST GROUP

Hello to All

Whew! CSM 2010 was exhilarating, exhausting, and eye-opening—hopefully for more of our members than just our leadership. We held our first ever legislative lunch forum with a fantastic panel of experts and interactive audience of 37 ARSIG members and Orthopaedic Section leadership. I thank Carrie Adrian, Justin Elliott, Paul Welk, Leslie Adrian, Dr. Janet VanDyke, Tara Frederickson, Terri DiFlorian, Jay Irrgang, and Tom McPoil for their involvement in the evolution of this meeting. I would certainly say that it was a success and yet only a stepping stone for the SIG. Our plan is to take our recorded/transcribed notes and put together more definitive legislative language and a position of our SIG with regards to the practice of physical therapy for animals. I promise that there is certainly more to come.

We also had our business meeting, which was partially a continued discussion from our legislative forum. You will find the minutes attached here in our newsletter. I was enlightened by our educational programming this year by Dr. Jackie Woelz and Ann Howard who spoke about complicated and challenging clinical cases in canine and equine rehabilitation. (We had a pretty good turn out for that as well—upwards of 75 in attendance.) I hope that they both will continue to share their experiences in their practice with our membership. I was very impressed by both of their approaches to rehabilitation management of these interesting cases.

Meetings, meetings, meetings... We also had a great turn-out for our educational discussion. This was very informal and, I think, really helped us to figure out what WE physical therapists and assistants need in education and continuing education to provide safe, effective, and expert level treatment to our patients while maintaining the confidence of our veterinary medical colleagues. We will continue with the evolution of this educational plan as it will relate directly to legislative efforts and plans for further certification or specialization of our members. Please do not hesitate to contact Carrie or me if you are interested in helping us to take this from brainstorm to fruition.

On a personal note, by the time this newsletter is published, I will be a resident of Massachusetts, moving from Maryland where I first established my practice in physical therapy for animals 9 years ago. I will continue to be involved in the legislative and educational efforts that have been initiated in Maryland, though now from a little further away. I look forward to meeting many more of our ARSIG members in the New England region and helping my future clients and patients to Move Forward!

I'm very excited about continuing my involvement in the ARSIG as President and hope that in the next 3 years we can press on and forward with our goals in education, legislation, and clinical practice. We are developing a core group of mem-

bers who are bringing some amazing ideas to the table. I am very excited about this and encourage you to get involved in some way with the SIG.

Again, do not hesitate to contact me with any questions, comments, or concerns.

Have a beautiful spring!
Amie L. Hesbach, MSPT, CCRP, CCRT
forpawsrehab@gmail.com

**PS: Don't forget about our listserv—
aptsig@yahoogroups.com!**

EDUCATIONAL OPPORTUNITIES FOR PTS/PTAS IN PHYSICAL THERAPY FOR ANIMALS

*By: Jennifer Brooks (jenequinept@charter.net) and
Amie Hesbach (forpawsrehab@gmail.com)*

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Equine Rehabilitation**
Arlene White, PT
www.equinerehabilitationinstitute.com/
www.AnimalRehabInstitute.com

Equinology
www.equinology.com/default.asp

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Program in Canine Rehabilitation (and Equine
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ANIMAL REHABILITATION SPECIAL INTEREST GROUP (ARSIG) BUSINESS MEETING MINUTES
APTA CSM 2010 San Diego, California
February 19, 2010

- I. Call to Order at 7:00 a.m.
- II. Welcome. Amie and Carrie made the executive decision to continue with discussions from Thursday's legislative forum. The notes and transcripts from these discussions will be "electronically blasted" to the membership later this spring. The actual business meeting began at 7:40 a.m.
- III. Roll Call & Introduction of 2009 Officers & Committee Chairs
- A. Amie Lamoreaux Hesbach – President
 - B. Carrie Adamson Adrian – Vice-President
 - C. Donna Redman-Bentley – Research Committee Chairperson
 - D. Charles Evans – Practice Committee Chairperson/ State Liaison Coordinator (Unable to attend.)
 - E. Cheryl Riegger-Krugh – Nominating Committee Chairperson
 - F. Lisa Bedenbaugh – Newsletter Chairperson
 - G. Jay Irrgang – Orthopaedic Section (OS) Liaison/ APTSIG Advisor
- IV. Old Business
- A. Approval of CSM 2009 APTSIG Business Meeting Minutes
 - 1. MOTION made, seconded, and passed.
 - B. President's Report (Amie Hesbach)
 - 1. Practice Analysis: The practice analysis is in the statistical analysis stages. We are also doing a further literature review. We will begin the actual writing stage of the PA soon with advisement from the OHSIG and PASIG.
 - 2. Communication/Public Relations: Carrie was busy this year writing letters in response to proposed legislation and rule/regulation changes as well as in response to the AARV letter that was addressed to all veterinary school deans and veterinary medical associations.
 - a) New Jersey letter
 - b) Nebraska letter
 - c) Letters to:
 - (1) AARV
 - (2) DVM Boards
 - (3) PT Boards
 - (4) AVMA Chapters
 - (5) APTA Chapters
 - 3. Political Liaison Update: Amie addressed the following reports from liaisons.
 - a) American Association of Rehabilitation Veterinarians (AARV)
 - (1) Position Statement: This was discussed in detail at the legislative luncheon.
 - (2) Report per Dr. Julie Mayer: "We did

have a business meeting at the North American Veterinary Conference in January in Orlando, FL and had an all day track of lectures on rehab. Dr. Jamie Gaynor, Dr. Sherman Canapp, and I presented. Because we have been so busy with this first annual appearance we have not been able to focus on other things. We are in the final stages of forming an affiliate veterinary technician rehabilitation association. We are in the process of posting our Newsletter for members and tallying the results of our rehab practice management survey."

- a) International Association of Veterinary Rehabilitation & Physical Therapy (IAVRPT)
 - (1) The next Symposium will be August 4-7, 2010 Auburn, Alabama, USA. Information can be found through a link on the IAVRPT Web site at www.iavrpt.org.
 - b) American College of Veterinary Sports Medicine & Rehabilitation (DACVSMR): This specialization looks as if it will be approved. The next step will be establishing internships/residencies for potential specialists. It has yet to be determined what role physical therapists will take with regards to this specialty.
 - c) WCPT
 - (1) Report per Steve Strunk: "The WCPT is very supportive of establishing a subgroup for animal physical therapy. Several other areas of physical therapist practice are also slated for application at World Conference in Amsterdam, 2011. There are 13 countries with animal PT groups in 4 WCPT regions. The WCPT is in the process of second editing of the constitution for animal PT subgroup, which will be disseminated to all international representatives for commentary."
- B. Vice President/Education Committee Report (Carrie Adrian)
- 1. Educational Opportunities: Carrie would like to further discuss educational needs of members.
 - 2. CSM 2011 programming ideas. Suggestions were made to have a veterinarian discuss zoonoses or do a clinical update as well as have a session on myofascial release/soft tissue management on horses/dogs. CSM topics will be submitted within the month.
 - 3. Clipboards: The canine clipboards are still for sale. Contact the Orthopaedic Section to purchase.
 - 4. FAQ/State Liaison resources. Information is online and continues to be accessible by members.

- C. Practice/State Liaison Committee Report (Charlie Evans)
1. Legislative Luncheon, Thursday, February 18, 2010.
 2. State Liaison Program brainstorms? Charlie was unable to attend CSM but there will be an effort to reorganize our state liaison program. If any member has ideas or suggestions, we'd love to hear them.
 3. Liaison/member resources on ARSIG webpage (www.orthopt.org).
- D. Research Committee Report (Donna Redman-Bentley)
1. Nominations for committee chairperson? Kirk Peck and Jennifer Brooks have been nominated to the research committee. More to follow.
- E. Nominating Committee Report (Cheryl Riegger-Krugh):
The results of the election in 2009 include:
1. President: Amie Lamoreaux Hesbach, MSPT, CCRP, CCRT
 2. Vice President/Education Chair: Caroline Adrian MS, PT
 3. The Nominating Committee consists of:
 - a) Chair: Cheryl Riegger-Krugh PT, MS, ScD
 - b) Member: Jennifer Hill MS, PT
- F. Orthopaedic Section Liaison Report (Jay Ir-gang). Jay was in attendance but did not have a report.

II. New Business. As there was not adequate time to discuss these topics, the information that has been collected will be posted to the SIG Web site and in future newsletters.

- A. Professional Liability Issues (Deanna Rodgers)
- B. Veterinary Insurance Reimbursement Issues (Charlie Evans)
- C. Resources for ACCE's (Cheryl Riegger-Krugh)
- D. Taskforce for the Definition of Standards of Education for Non-Physical Therapists (Cheryl Riegger-Krugh)
- E. Continuing Education/Residency/Fellowship discussion: All are invited to attend a discussion on Friday, February 19, 2010.
- F. Call for Nominations & Committee Chairs/Members
 1. Research Committee Chairperson. (as above)
- G. Other New Business

III. Open Forum

IV. Adjournment at 7:55 AM.

PROFESSIONAL LIABILITY INSURANCE OPTIONS FOR PHYSICAL THERAPISTS IN ANIMAL REHABILITATION

By: Deanna Rogers (deanna.rogers@gmail.com) and Amie Hesbach (forpawsrehab@gmail.com)

The following is a list of insurers who have been contacted by the ARSIG regarding their provision of professional liability insurance (PLI) to physical therapists who perform physical therapy for animals. Please understand that this is a work in progress and that we will continue to update this list.

Harleysville: Email response pending.

Hartford: Email response pending.

HPSO: Limited to \$500 for damage to personal property IF animals are considered property in the state in which you practice AND the physical therapy practice act does not refer to humans/individuals.

IAAMB: "This insurance includes professional (malpractice) liability and general (premises or "slip & fall") liability coverage of \$5,000 per occurrence/\$2 million aggregate. Insurance premium includes taxes, license and fees."
Pinnacle: No.

Zurich: Deanna plans to contact agents; the initial response was "no, only coverage for DVM/VMDs who are members of the AVMA".

REVIEW OF PET INSURANCE COVERAGE FOR REHABILITATIVE SERVICES

By: *Charlie Evans* (cevans@intownvet.com)

When looking for specific information about a 3rd party provider check on the specific policy and individual state statutes.

If looking for general information about a variety of plans go to: <http://www.petinsurancereview.com/dog.asp>

Hartville Group, Inc- 1-800-738-2677 – Rating 6.12

<http://www.hartvillegroup.com>

Structured as a holding company, the Hartville Group owns several subsidiaries dedicated to different aspects of pet health insurance. These subsidiaries include Petsmarketing Insurance.com Agency Inc., an insurance agency licensed to provide property and casualty insurance in 50 states in the United States and the District of Columbia; and Hartville Re, a reinsurance subsidiary domiciled in Georgetown, the Cayman Islands.

We are the ASPCA's only strategic partner for pet health insurance. The ASPCA, America's leading animal welfare organization, chose us as their partner because of our focus on pet health and our humane coverage philosophy.

No coverage for rehabilitative services

Embrace Pet Insurance – 1-800-511-9172 – Mayfield Village, OH – Rating 9.13

<http://www.embracepetinsurance.com>

An Ohio-based company offering customizable pet insurance in every state with flexible pricing options. Embrace added a wellness program in 2009 that has no deductible, copay, nor waiting period. For every policy sold, Embrace donates \$2 to a pet-related charity.

Provide coverage for rehabilitative services for any known accident or illness. Include holistic treatments.

Petfirst Healthcare – 1-866-937-7387 – Jeffersonville, IN – Rating 8.56

<http://www.petfirsthealthcare.com>

PetFirst Healthcare, an innovative leader in pet insur-

ance, offers easy to understand lifelong coverage for dogs and cats. PetFirst's comprehensive coverage is unique in the industry providing simplified coverage with no per diagnosis limits and premiums unaffected by age, breed or location. The Family Plan from PetFirst allows owners to insure multiple pets under one policy for a fraction of the cost. PetFirst provides reliable customer service and prompt claims reimbursement to complement their healthcare offering.

If the diagnosis is covered in your policy, then rehabilitative services will be included in the coverage.

Petplan USA – 1-866-467-3875 – Philadelphia, PA – Rating 9.19

<http://www.gopetplan.com>

Petplan is the world's leading pet insurance provider, available in every state and the District of Columbia. Petplan policies include full coverage for all hereditary conditions with no dollar or time limits per condition. Nine out of 10 veterinarians recommend their policies.

If the diagnosis is covered in your policy then rehabilitative services will be included in the coverage.

Trupanion Pet Insurance – 1-800-569-7913 – Lynnwood, WA – 8.57

<http://www.trupanionpetinsurance.com>

Canadian pet insurance company Vetinsurance has launched a new US brand under the name Trupanion. Currently doing business in 30+ states, with plans to expand to all 50 states.

Trupanion insures dogs and cats between 8 weeks and 14 years.

No coverage for rehabilitation services

Veterinary Pet Insurance (VPI) – 1-888-899-4874 – Brea, CA – Rating 5.06

<http://www.petinsurance.com>

Founded in 1980, VPI is the oldest and largest health insurance plan for pets in the US. VPI plans cover dogs, cats, birds and exotic pets for medical problems and conditions relating to accidents, illnesses and injuries. Optional vaccination and routine care coverage is also available.

Reimburse owner 90% of all costs incurred. Owner pays hospital, send bill to VPI

Pet Partners Inc (AKC Pet HealthCare Plan) – 1-866-725-2747 – Raleigh, NC – Rating 4.85

<http://www.akcpethealthcare.com/BHIA/>

Offers insurance plans through the AKC brand.

If the diagnosis is covered in your policy then rehabilitative services will be included in the coverage.

Pets Best Insurance – 1-888-899-0402 – Boise, ID – Rating 7.52

<http://www.petsbest.com>

Currently offers plans in 46 states. Founded by veterinarian Jack Stephens, founder of VPI.

If the diagnosis is covered in your policy then rehabilitative services will be included in the coverage.

Pethealth Inc (PetCare Brand) – 1-866-275-7387 – Oakville, ON – 4.08

<http://www.petcareinsurance.com>

Pethealth offers pet insurance in both the US and Canada, currently offering its PetCare Pet Insurance Programs in 10 provinces, all US states (except Alaska) and Washington, D.C. In addition to the PetCare Pet Insurance Programs, Pethealth offers its pet insurance programs under a variety of names, including QuickCare, ShelterCare, 24 Pet Watch and Union Plus Pet Insurance. Recently joined with PETCO to offer insurance under the brand Petcare Pals.

If the condition is covered they will reimburse for those treatments recommended by the veterinarian. Includes massage and aquatic therapy

Purina Care (Pet Health Insurance) – 877-878-7462 – San Antonio, TX – Rating - 8.77

<http://www.purinacare.com>

PurinaCare offers 2 plans, one with preventive care and one without. Currently doing business in 47 states and DC. PurinaCare is one of only two companies to have received the AAHA (American Animal Hospital Association) Seal of Acceptance. They are underwritten by Central States Indemnity of Omaha, a Berkshire Hathaway Company.

Cover 80% of cost for all treatments recommended by the referring veterinarian.

Pet Assure – 1-888-789-7387 – Lakewood, NJ - Rating – 7

<http://www.petassure.com>

An alternative to insurance, Pet Assure members obtain discounts from a network of thousands of veterinarians and pet suppliers. Members must go to participating veterinarian to get the savings.

Banfield Wellness Plans – 1-800-838-6738 – Portland, OR – Rating – None

<http://www.banfield.net>

Banfield is not an insurance company, but a membership plan that offers wellness benefits. Members must go to Banfield pet hospitals, which are located within PetSmart stores throughout the United States.

There are several different plans available for dogs and cats, including one that includes a spay or neuter service. There is a one-time sign-up fee and monthly payments that start at \$12.95.

Orthopaedic Physical Therapy Practice Instructions to Authors

Christopher J. Hughes, PT, PhD, OCS, Editor
Sharon L. Klinski, Managing Editor

1. Orthopaedic Physical Therapy Practice (OPTP) serves as a publication option for articles pertaining to clinical practice as well as governance of the orthopaedic section and corresponding Special Interest Groups (SIG). Articles describing treatment techniques as well as case studies, **small sample studies** and reviews of literature are acceptable. **Papers on new and innovative technologies will also be considered for publication.** Language and format of articles should be consistent with the Guide to Physical Therapist Practice. SIG authors must adhere to the 12 page limit when submitting articles as part of SIG report.

2. Manuscripts should be reports of personal experiences and written as such. Though suggested reading lists are welcomed, references should otherwise be kept to a minimum with the exception of reviews of literature. All authors are required to sign a consent form indicating verification of original work and this form must accompany your work at the time of submission. This form can be found on the Orthopaedic section website (www.orthopt.org) under the Orthopaedic Physical Therapy Practice link. Authors are solely responsible for proper citation of work and avoiding any issues with copyright infringement related to writing or use of images or figures. For more information on plagiarism authors may find the following resources helpful:

<http://www.plagiarism.org/>

http://www.turnitin.com/research_site/e_home.html

3. **Presenting research:** OPTP welcomes traditional experimental research studies as well as case reports. Studies involving human subjects must have successfully met the requirements and been approved through an institutional review board. Case reports of involving 3 or less subjects must follow HIPAA guidelines in protecting the privacy of subjects. For more information access the following:

<http://www.hhs.gov/ocr/hipaa/>

4. Article review process.

Authors will be immediately notified of receipt of document by managing editor. All initial reviews are done by the editor, managing editor, and also possibly a member of the advisory council of OP. A schematic of the review process is attached. Articles are reviewed in the order in which they are received. You will receive a confirmation of your submission and will be updated on the status of your work as we complete the review process. A schematic of the review process is attached.

5. Manuscript Preparation Guidelines

Title Page - include the author's name, degree, title, current place of work or affiliation, corresponding address, phone and FAX numbers, and email address.

Abstract - Abstract of 150 words or less using double space format. Abstracts at minimum should include the following headings: Background and Purpose, Methods, Findings, Clinical Relevance
Key words should also be listed after the abstract.

Format – text should be a minimum of 12 pages double-spaced, use

a 12-point font; margins should be 1 inch on each side. Headings should be formatted as follows:

MAIN HEADING

Secondary Heading

Tertiary heading

Citation of Reference List – references should be numbered sequentially as they appear in the text and should correspond to the superscript number in the text. Do not repeat the same reference using a different number in the reference list. Only references cited in the paper should be listed.

Journal Articles

16. Ferguson CT, Cherniack RM. Current concepts: management of COPD. *N Engl J Med.* 1993;328:1017-1022.

17. Rueben DB, Siu AL. An objective measure of physical function of elderly outpatients (The Physical Performance Test). *J Am Geriatric Soc.* 1990;38:1105-1112.

Books

18. Steindler A. *Kinesiology of the Human Body Under Normal and Pathological Conditions.* Springfield, Ill: Charles C. Thomas; 1995:63-64.

Abbreviate United States state and territory names as specified in the *American Medical Association Manual of Style*—NOT according to the United States Postal Service abbreviations.

Editor(s) as author:

19. Scully RM, Barnes ML, eds. *Physical Therapy.* Philadelphia, Pa: JB Lippincott Co; 1989:83-98.

Reference to part of a book:

20. Goodman CC. The endocrine and metabolic systems. IN: Goodman CC, Boissonault WG, eds. *Pathology: Implications for the Physical Therapist.* Philadelphia, Pa: WB Saunders; 1997.

Tables – provide tables to present information more clearly and concisely than if presented in the text. Table titles are usually written as phrases. They are capitalized in title case and do not employ terminal punctuation: Table 1. Symptoms of Chronic Fatigue Syndrome

Reference to a Web site:

Information on Total Knee Replacements. American Academy of Orthopedic Surgeons. Available at: http://www.aaos.org/wordhtml/research/oainfo/OAinfo_knee_state. Accessed on September 5, 2005.

Format and Presentation of Figures, Graphics and Tables

Figures and Graphics:

• Figures should be submitted as separate, high-resolution graphic files in TIF, JPG, EPS, or PDF format, with the resolution set at a minimum

of 300 dpi. Rule of thumb: the larger the figure (eg, 8 1/2" x 11"), the better. Figures – prepare as 5 x 7 black and white photographs, camera-ready artwork (eg, line drawings and graphs), or as professional-quality computer file images. A photo release form must accompany any photographs where patients may be seen. Figure legends may be phrases or complete sentences, capitalized in sentence case, and end with a period:

Figure 2. Kinesthetic testing using an electronic inclinometer.

If electronic formats are not available to you, figures must be submitted as 5" x 7" camera-ready glossies and mailed to the Editorial Office. Figures should be numbered consecutively. For helpful guidelines on submitting figures online, visit Cadmus Journal Services (<http://www.cadmus.com/>). Lettering should be large, sharp, and clear, and abbreviations used within figures should agree with Journal style. Color photographs are encouraged but must be of excellent resolution and good contrast.

• **Legends to Figures.** Type all legends on one page after the reference list and tables.

• Tables should be formatted in Word and placed together at the end of the manuscript, after the references. Tables should be numbered consecutively. Refer to recent issues for acceptable table formats.

3. Manuscripts are only accepted electronically. Save your monograph in Microsoft Word or plain text format. If figures cannot be sent electronically then prepare the content of any original photographs and artwork for shipment. Include a cover letter indicating author and title of the paper the photographs or artwork are to be used for. Send to:

Orthopaedic Physical Therapy Practice

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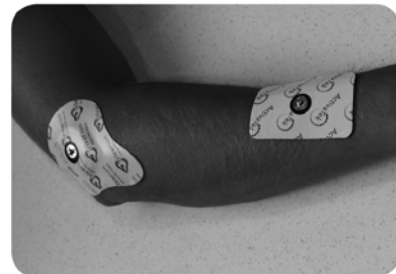
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