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

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

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Out of the Mouths of Babes: Student-cited Barriers to Evidence-based Practice

The phrase 'evidence-based practice' is ubiquitous in physical therapy academia, and it is being used more frequently in clinical settings. This should be a cause for great celebration, given our profession's goals for Vision 2020. In teaching evidence-based practice, I encourage students to be 'critical consumers' of (1) the scientific rehabilitation literature and (2) their own clinical practice. One way this can be accomplished is to have the students collect outcome data from clinical affiliations. These data are then used to complete a case report or case series to determine if meaningful changes were likely to have occurred using standard error of measurement (SEM) or minimal clinically important difference (MCID) criterion. During this process students are also given a chance to reflect on how, or if, measuring outcomes will affect their future clinical practice. This current issue of *OPTP* has 2 such examples from our students at the University of Florida. I am not suggesting this is a novel approach for incorporating an 'evidence-based' experience into entry-level physical therapy education. The importance of completing a case report,[1,5] a case series,[4] and describing clinical instructor (CI) - student outcomes[2] have all been previously documented in our literature.

As someone who teaches an evidence-based practice course sequence, I often wonder if what is taught in the classroom is being adequately modeled in the clinic. The source of my skepticism comes directly from the aforementioned data collection experience. To successfully complete my course, students present a scholarly paper and a scientific poster presentation to our professional community. Students are expected to name as authors, others who helped them complete their projects, using accepted guidelines reviewed in class. As such, I expected every CI to be included as an author on these projects and was surprised when this was not the case.

After some prodding, I found that while some CIs were helpful, others were ambiguous or unsupportive toward students trying to complete this project. My initial surprise lead to frank discussions with students about what they encountered in the clinic. Most of the discussions focused on the somewhat broad topic of CIs being unfamiliar and/or uncomfortable with an evidence-based model of clinical practice. To illustrate, I share the following student-identified barriers for translating evidence-based practice from the lecture hall to the clinic.

1. Lack of understanding of common statistical estimates used to report clinical data (ie, numbers needed to treat, odds ratios, etc).
2. Unfamiliar with what comprises a 'quality' study for common physical therapy practice patterns of diagnosis, prognosis, and intervention.
3. Lack of awareness that clinical experience is a valued component of evidence-based practice, but it is not the universal 'trump card' for making clinical decisions.
4. Unable to access the World Wide Web for current information. This barrier has nothing to do with access to the Web. Instead, students had CIs that could not formulate answerable clinical questions or efficiently search on-line databases for peer-review literature.
5. Unwilling to change entrenched practice patterns. Common examples for this barrier were: (1) continued reliance on unsubstantiated examination and treatment options, even in the presence of opposing high-quality evidence and (2) discouraging students from using validated outcome measures because they take "too much time," yet offering no other systematic way to assess patient outcome.
6. Sole reliance on traditional continuing education model for post-professional education. Students noted that CIs were often not 'critical consumers' of information or techniques obtained through such channels. The problem was not the number of tools in the tool box, but that the tools were never removed or modified. A specific and common example of this is the continued use of cranio-sacral therapy by CIs, without awareness of the obvious limitations of such an approach.[3]

I fully acknowledge that these student-cited barriers are based purely on anecdotal experiences from a single academic setting (low-level evidence for those keeping score at home). Although these barriers have been consistently noted over the past 3 years, I have no idea of their frequency as they have yet to be systematically tracked. For these reasons, their impact should be regarded appropriately. I do think that there is the potential of frustrating a generation of student physical therapists who are well prepared to "do" evidence-based practice. To the point--nothing will impede our progress toward Vision 2020 more than a group of students having evidence-based practice inadequately modeled in clinical settings.

In our own grassroots efforts, I have been impressed by the students' initiative to include these topics in their clinical in-services. This represents a vast improvement over the traditional in-service topic of reviewing the pathoanatomy and treatment of a selected diagnosis, usually with information regurgitated from unsubstantiated class notes and/or antiquated text books. Even more encouraging is that some clinical environments appear to be eagerly receptive to evidence-based practice, perhaps motivated by the looming specter of pay-for-performance.[2]

Grassroots efforts will likely not succeed in creating evidence-based practice as a clinical norm. Our profession needs a coordinated effort to systematically address these

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barriers. Transitional DPT (tDPT) training is a potential solution since most programs offer an evidence-based course. However, depth of content varies from program to program, and completion of a tDPT degree is not a pre-requisite to becoming a CI. Another option would be to set up opportunities for clinicians and students to solve clinical problems by bringing together their collective strengths of clinical experience and familiarity with evidence-based practice, respectively. Successful models could be then implemented on a national scale. It also seems that including an intensive evidence-based module would be a valued addition to APTA sponsored clinical instructor education programs and from this an evidence-based practice competency could be developed. Whatever the potential solutions are, clinicians, students, and academicians jointly addressing these and other barriers to CI-student interactions is worthy of our attention, and will ensure our profession continues to move forward on the promises of Vision 2020.

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Mark D. Bishop and Joel E. Bialosky for their suggestions on a draft of this editorial. University of Florida physical therapy students for their open discussions on these matters.

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president's corner

James Irrgang, PT, PhD, ATC
President, Orthopaedic Section, APTA, Inc.

I am excited to begin my term as President of the Orthopaedic Section of the American Physical Therapy Association and I look forward to serving, you, the Section members to advance the practice of orthopaedic physical therapy. Writing this message is my first official act as President and the first thing that I would like to do is to thank Mike Cibulka for his dedication and leadership that he provided to the Section. As a result of his efforts, the Section is much stronger in every aspect than it was when he assumed the Presidency 6 years ago. Mike was instrumental in getting me more involved in the Section 10 years ago and I am honored to follow in his foot path. Having said that, one thing that you will not see in this column over the next 3 years is Mike's mastery of the lexicon. In fact, lexicon, will probably be the most sophisticated word that I will use in the next 3 years!

I would also like to recognize and acknowledge our current Executive Board members including Tom McPoil, Vice President; Joe Godges, Treasurer; Bill O'Grady, Director; and Ellen Hamilton, who was appointed to my vacant Director's position. Serving in an advisory capacity to the Executive Board are Lori Michener, Chair of the Research Committee; Robert Rowe, Chair of the Practice Committee; and Beth Jones, who was appointed to replace Ellen Hamilton as the Education Committee Chair. The Board could not function without the support of our office staff including Terri DeFlorian, Executive Director; Tara Fredrickson, Executive Associate; Sharon Klinski, Managing Editor of Journals and Newsletters; Kathy Olson, Managing Editor of Independent Study Courses, and Carol Denison, ISC Processor/Receptionist. Together the Board and office staff are totally committed to serving you. We invite you to contact us with any questions you have or to express any concerns.

One of my priorities for the next 3 years is to create opportunities for greater involvement of members and to encourage you to participate in Section activities including serving on Section Committees (Membership, Research, Practice), authoring Independent Home Study Courses, serving as speakers for Section sponsored educational programming, and submitting articles to *Orthopaedic Physical Therapy Practice.* Members of all levels including students, new graduates, seasoned clinicians, and orthopaedic clinical specialists are encouraged to get involved. If you are interested in getting involved, please contact the Section office to express your interests.

One of the reasons I consented to serve as President is because the Section is engaged in many exciting activities that I believe will advance the practice of orthopaedic physical therapists. A brief summary of these activities follows:

- **Strategic Plan**—This past Fall, the Section Board, Committee Chairs, and Special Interest Groups leadership met to develop a strategic plan for the next 3 years. The plan will be finalized later this spring, at which time it will be shared with the membership in *Orthopaedic Physical Therapy Practice*.
- **ICF Based Guidelines for Treatment of Common Orthopaedic Conditions**—In 2006, the Section began development of evidence-based practice guidelines for treatment of orthopaedic conditions commonly treated by physical therapists that are consistent with the model of functioning described in the International Classification of Functioning and Disability (ICF) that was published by the World Health Organization in 2001. Guidelines are under development for common conditions involving the foot and ankle, knee, hip, low back, neck, shoulder, elbow, and wrist and hand. Workgroups for each body region have been identified and they have been tasked with identifying the common impairments in body structure and function, activity limitations, and participation restrictions commonly associated with orthopaedic conditions. Following this, the workgroup will identify evidence-based treatment recommendations taking into consideration classification of the patients into homogeneous subgroups as appropriate. Preliminary treatment guidelines for hip fractures, cervical pain, and plantar fasciitis were presented at the recent Combined Sections Meeting in Boston, MA. These guidelines have also been posted on the Orthopaedic Section website at www.orthopt.org. You are encouraged to access the website and to provide comments on the preliminary guidelines. In the future, these guidelines will be summarized for publication in the *Journal of Orthopaedic and Sports Physical Therapy* (*JOSPT*).
- ***Journal of Orthopaedic and Sports Physical Therapy***—The *JOSPT* continues to see growth in terms of the number and quality of articles published and in impact factor. The current impact factor for *JOSPT* is 1.395 ranking it 10th among all publications related to rehabilitation. Working together with the Sports Physical Therapy Section, the funding and composition of the *JOSPT* Board has been revised. As a result of this, each Section will contribute funding on a per member basis and composition of the *JOSPT* Board of Directors will be proportional to the number of members in each Section. We believe that this reorganization will allow for continued growth of the *JOSPT*.
- **Annual Orthopaedic Section Meeting**—The Section is considering an Annual Orthopaedic Section Meeting to provide additional continuing education opportunities for Section members. In part, we are considering this due to limitations in the continued growth of the Combined Sections Meeting. Additionally we believe that we can provide programming that is more focused to the interest of orthopaedic physical therapists, including expanded programming for Special Interest Groups and programming to support residency training. In making a final decision regarding an Annual Orthopaedic Section Meeting, the Board will take into consideration the impact of this meeting on the Combined Sections Meeting, the APTA Annual

Meeting, and Annual Chapter Meetings. A final decision on this initiative is expected this spring.

- **Potential Changes in Criteria to Sit for the Orthopaedic Clinical Specialist Certification Examination**—The Orthopaedic Specialty Council is considering changes in the criteria for sitting for the Orthopaedic Clinical Specialist examination. These revisions would require candidates for the certification examination to either complete an APTA credentialed orthopaedic clinical residency or to complete activities that are comparable to an orthopaedic clinical residency. These activities would include completion of continuing education activities that are consistent with the scope of knowledge, skills, and abilities described in the Description of Specialized Practice for orthopaedic physical therapy, serving as an APTA-credentialed clinical instructor for an entry-level student, and submitting a case list of patients managed by the candidate that includes self-reflection. The impetus for these changes are concerns expressed by members of the Orthopaedic Section related to the value and perceived validity of the certification process by other health care practitioners. These proposed changes are not inconsistent with the criteria to sit for specialist certification in the areas of sports physical therapy and clinical electrophysiology. A proposal to implement these revised criteria has been submitted to the American Board of Physical Therapy Specialties and will be considered in May. If adopted, the criteria will be phased in over the next several years.

As you can see, there are many exciting changes and activities that are currently being considered by the Orthopaedic Section Board of Directors. Please feel free to contact us to comment on these initiatives. In future columns I will continue to provide updates on these as well as other activities.

AAOMPT 2007 - CALL FOR ABSTRACTS

Featured Speakers: Mariano Rocabado and Michele Sterling

The 13th Annual Conference of the American Academy of Orthopaedic Manual Physical Therapists will be held October 19-21, 2007, in St. Louis, MO. Interested individuals are invited to submit abstracts of original research for presentation in platform (slide) or poster format. The AAOMPT research committee chairman, H. James Phillips, must receive the abstract via e-mail by June 1, 2007. Abstracts received after this date will be returned. You will be notified of the acceptance/rejection of your abstract in July. If you have any questions call the research committee chairman at (201) 370 7195 or via e-mail at: phillih o@shu.edu. For additional organization information, check our website, www.aaompt.org.

CONTENT. The Academy is soliciting all avenues of research inquiry from case-report and case-series up to clinical trials. The Academy is particularly interested in research evaluating intervention strategies using randomized-controlled clinical trials. The abstract should include 1) Purpose; 2) Subjects; 3) Method; 4) Analyses; 5) Results; 6) Conclusions; 7) Clinical Relevance.

PUBLICATION. The accepted abstracts will be published in The Journal of Manual & Manipulative Therapy, which has readership in over 40 countries.

SUBMISSION FORMAT. The format for the submitted abstracts is as follows:
The abstract must be submitted by email in MS Word format to the research committee chairman (phillio@shu.edu). The abstract should fit on one page with a one-inch margin all around. The text should be typed as one continuous paragraph. Type the title of the research in ALL CAPS at the top of the page followed by the authors' names. Immediately following the names, type the institution, city, and state where the research was done. Please include a current email address where you can be contacted.

PRESENTATION. The presentation of the accepted research will be in either a slide or poster session, at the discretion of the Research Committee. The slide session will be limited to 10 minutes followed by a 5-minute discussion; this session will be primarily for research reports and randomized clinical trials. The poster session will include a viewing and question answer period and will be primarily for case report/series.

PRESENTATION AWARDS. The platform and poster presentations deemed of the highest quality of those presented at the annual conference will be awarded the AAOMPT Richard Erhart Excellence in Research Award (platform), and the AAOMPT Outstanding Case Report (poster). The awards include free tuition for the AAOMPT conference the following year.

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Conservative Management of Medial Elbow Pain in a High School Baseball Pitcher: A Case Report and Review of the Anatomy and Biomechanics of Overhead Throwing

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ABSTRACT

Study Design: Case Report. **Background**: Overhead throwing imparts significant tensile, shearing, and compressive forces throughout the entire upper extremity, and because of the repetitive nature of overhead throwing in sports, the potential for injury to the throwing arm is significant. Medial elbow pain accounts for up to 97% of all elbow complaints in overhead throwers. Elbow pain can arise from a number of mechanisms in this population. **Case Description**: The author describes the anatomical and mechanical considerations in overhead throwing as well as how the patient's age influences differential diagnosis and intervention. The purposes of this case report are to: (1) describe the findings from an examination of a patient with medial elbow pain that includes assessment of impairments in the thoracic spine, shoulder, and elbow and (2) describe an intervention that includes active exercise and modification of functional activities to minimize the impact of impairments in these regions. **Outcomes**: With conservative management, the patient was able to return to play without complaints of pain or difficulty throwing. **Discussion**: Intervention directed at correcting muscular imbalances at both the shoulder and elbow was critical to eliminating the patient's complaints of medial elbow pain and returning the patient to competition.

Key Words: shoulder rehabilitation, scapular stabilizers, throwing injuries

INTRODUCTION

As participation in overhead throwing sports has increased over the past few decades, our understanding of upper extremity mechanics and pathology in these sports has developed and expanded. Overhead throwing imparts significant tensile, shear, and compressive forces throughout the entire upper extremity. In addition to these stresses, the repetitive nature of overhead throwing in sports makes the potential for injury to the upper extremity significant.

Not surprisingly, elbow pain is a common finding of overhead athletes, especially baseball pitchers.[1] Medial elbow pain accounts for up to 97% of elbow complaints in this population,[1] and the most common injuries to pitchers involve the medial elbow.[2] Few activities produce greater forces acting at the medial elbow than the overhead throw.[3]

Differential diagnosis of medial elbow pain can be difficult. Despite a thorough history and examination of the upper extremity, as well as knowledge of upper extremity anatomy and mechanics, concurrent pathologies at the upper extremity can exist. Nevertheless, the clinician can differentially diagnose the etiology of symptoms based on the site of pain and the nature of the injury.[4]

ANATOMY OF THE SHOULDER AND ELBOW

The elbow is one of the most congruent joint complexes in the body.[3,5] Three articulations and significant muscular and ligamentous support contribute to the stability of the elbow complex. The proximity of the three articulations within the same joint capsule classifies the elbow a compound synovial joint.[6,7]

The elbow articulations consist of the humeroulnar, humeroradial, and proximal radioulnar joints. The humeroulnar or trochlear joint is a uniaxial hinge joint comprised of the trochlea of the humerus and the trochlear fossa of the proximal ulna. The humeroradial joint is a hinge and pivot joint, allowing for flexion and extension as well as rotation of the head of the radius on the capitellum of the humerus.[8] The proximal radioulnar joint, which has continuity with the elbow articulations,[7] is a modified pivot joint, facilitating supination and pronation of the forearm. These articulations allow for 2° of freedom at the elbow: flexion-extension and pronation-supination.

The elbow articulations provide the majority of elbow stability from 0° to 20° and 120° to 145° of elbow flexion.[6] The anterior bundle of the ulnar collateral ligament is the primary restraint to valgus stress at the elbow[1,3,5,8-13] in the range of 20° to 120° of flexion.[6,14] Originating from the inferior aspect of the medial epicondyle of the humerus, the anterior bundle attaches onto the medial coronoid process of the ulna, giving it a mechanical advantage against valgus stress.[15]

This anterior bundle is divided into anterior and posterior bands. The anterior band is the primary stabilizer against valgus stress up to 90° of flexion.[1,12] The posterior band is a secondary stabilizer against valgus stress until approximately 60° of elbow flexion, becoming a more prominent stabilizer through the remainder of elbow flexion.[1,12]

The posterior bundle is a fan-shaped structure that originates from the medial epicondyle and attaches to the medial margin of the semilunar notch.[1] Since it is thinner and weaker than the anterior bundle, the posterior bundle is a secondary elbow stabilizer with elbow flexed beyond 90°.[1] The oblique bundle, or transverse ligament, does not cross the elbow joint, unlike the anterior and posterior bundles. Instead, it is a thickening of the caudal aspect of the joint capsule, running from the medial olecranon to the inferior medial coronoid process.[1] Because of the overlapping functions of each distinct aspect of the ulnar collateral ligament; it provides valgus stability to the elbow throughout its range of motion.

Other noncontractile structures help to stabilize the elbow joint. The cord-shaped

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radial collateral ligament resists varus stress and reinforces the radiohumeral joint. The annular ligament is the primary stabilizer of the proximal radioulnar joint, maintaining stability of the radial head. The interosseous membrane prevents proximal displacement of the radius on the ulna,[14] although it is only on tension midway between pronation and supination.[7] The oblique cord runs from the lateral side of the ulnar tuberosity to slightly below the radial tuberosity, perpendicularly to those of the interosseous membrane.[7] Additional secondary restraint to valgus stresses is provided by the flexor-pronator muscle mass, the radiohumeral joint, and the elbow joint capsule.[9]

The specific role of the flexor-pronator muscle mass during the throwing cycle remains unclear.[9] However, these muscles may provide some degree of medial elbow stability by virtue of their partial origin on the medial epicondyle of the humerus.[1,9] Specifically, the flexor digitorum superficialis and flexor carpi ulnaris muscles are best suited for dynamic medial elbow support because they overlie the anterior band of the ulnar collateral ligament,[9,16] regardless of the degree of forearm rotation or elbow flexion.[9]

Although muscles may act independently, they typically function in groups at the elbow, but at the shoulder, they work as force couple pairs, controlling motion around a joint complex.[17] Blackburn et al[14] describe how muscles work both independently and in groups to form force couples, enabling the shoulder to function in overhead positions. Knowledge of these shoulder muscle mechanisms is essential to understanding how pathology in the shoulder can affect the mechanics of overhead throwing throughout the upper kinetic chain.

The supraspinatus, long head of the biceps, deltoid, and short external rotators each have their own function when acting independently. The long head of the biceps has a hood-like mechanism preventing cephalad excursion of the humeral head into the acromion during abduction of the arm.[14,18,19] The supraspinatus acts as a pulley mechanism fixing the humeral head against the glenoid fossa by contracting upward against the weight of the arm, however, when acting alone, it is unable to abduct the humerus.[14,18] The deltoid is also unable to abduct the arm when acting alone. Because its line of pull is close to the long axis of the humerus, the action of the deltoid pulls the humerus upward and outward.[14] Moreover, the infraspinatus and teres minor, called the short rotators, are unable to abduct the humerus when acting alone since they function to depress the humeral head.[14]

Acting together, the small humeral depression force of the short rotators offsets the deltoid's powerful upward and outward pull. The net result of these two individual mechanisms acting together is the deltoid-short rotator force couple, which can abduct the humerus. This force couple acts continuously throughout the motion of abduction.[14]

Similarly, the trapezius and serratus anterior act as a force couple to rotate the scapula upward and outward.[14,20] Together, these muscles ensure that the glenoid is maintained as a stable base for the humeral head throughout abduction active range of motion. Without scapular rotation, shearing between the humeral head and the glenoid can occur during abduction, resulting in a tendency to dislocate inferiorly.[14]

The force couples around the shoulder have dual roles. They provide dynamic stability to the glenohumeral joint while moving the upper extremity through extreme ranges of motion for throwing. Distal mobility must occur with proximal stability in order to accomplish overhead throwing. A review of the biomechanics of overhead throwing is essential for understanding how a throwing injury can occur at the elbow as a result of shoulder impairments.

THE BIOMECHANICS OF THROWING

A thrower must generate significant kinetic energy to propel a baseball with high velocity. [18] By using the lower extremities and torso, this energy can be generated, released, and dissipated through the throwing motion.[18,21] Several authors have described the overhead throwing cycle in detail, comprising 4 to 6 distinct phases.[1,14,18,20,22-25]

Three phases prepare the body for throwing. The initial phase is called the ***windup phase***. It begins when the pitcher moves initially and ends when the lower extremities and torso sequentially coiling up, with the leading leg lifted up and the throwing hand removed from the glove. The second phase is the ***stride phase***, beginning with the end of the windup and ending with the leading leg contacting the mound. During this phase, the legs and torso begin to unwind, generating momentum as the body rotates.

The third phase, ***the arm cocking phase***, continues the preparation for throwing by transferring the kinetic energy from the larger legs and torso to the smaller upper extremity. This phase begins when the leading leg hits the ground and ends when the arm has reached maximum external rotation. Early in this phase, the arm is positioned to throw as follows: the scapula is retracted, the elbow is flexed, the humerus is abducted, externally rotated, and horizontally extended.[24] Later in this phase, as the dominant side of the trunk rotates forward, the scapula begins to protract, giving the humerus a stable propulsive base.[24]

At maximum shoulder external rotation, the fourth phase, or acceleration, begins. At this phase, the significant kinetic energy generated by the unwinding of the legs and torso is further augmented by rotation at the shoulder, transforming this kinetic energy into angular or rotational velocity. The arm produces angular velocities of 3000° per second during this phase.[6,10,16,18] After which, the deceleration phase begins once the ball is released until the shoulder has reached maximum internal rotation, dissipating this momentum energy by slowing the arm down. Finally, the follow-through phase begins at maximum internal rotation until the pitcher has both feet on the ground and the arm has stopped moving.

THE ELBOW AND THROWING

During the overhead throwing cycle, the elbow helps to increase the angular velocity of the arm while positioning the hand to throw the ball. The elbow acts as a link to transmit the kinetic energy generated by the lower extremities and shoulder to the hand. Since the elbow is near the end of this kinetic chain, it must endure extreme forces with each throw.[16] Improper transfer or dissipation of kinetic energy and angular velocity can result in injury to the shoulder or elbow.

Several authors identify the valgus stress applied to the medial elbow during the acceleration phase as the likely source of medial elbow pain.[1,5,6,9,10,12,16,26-28] The medial aspect of the elbow must withstand significant distraction forces, which has been reported to be as high as 64N-m.[6,12,16,23,28] However, the ultimate tensile strength of the ulnar collateral ligament in cadavers is approximately 32N-m.[12,16,28] Since the ulnohumeral joint is near its open-packed position during most of the acceleration phase, it cannot contribute significantly to the stability of the elbow. Therefore, the brunt of the remaining valgus stress must be borne

by the flexor-pronator muscle mass. With a high level of eccentric activity absorbed by these muscles during acceleration, repetitive overload is quite common.[17]

Some authors have identified risk factors leading to injuries from overhead throwing, which include: overtraining, poor throwing mechanics, deconditioning, deficiencies in strength and flexibility, and age.[1,16,17,22,29] Younger throwers are also at risk for injury from other factors like deficient nutrition, associated disease states, and growth plate damage.[29] A previous history of injuries distant or local to the throwing arm can put a throwing athlete at risk for further or future injury.[17]

Four possible causes of medial elbow pain are: the flexor-pronator muscle mass strain, the ulnar collateral ligament complex sprain, intra-articular pathology, and the ulnar nerve compression. In the adolescent thrower, medial epicondyle avulsion fractures and apophysitis are injuries commonly associated with medial elbow pain.[30] Medial epicondyle avulsion fractures are typically the result of an acute onset of medial elbow pain[11] accompanied by a crack or pop after a hard throw.[30] Players with this type of injury are unable to return to throwing, demonstrating effusion and limited elbow range of motion.[30]

In contrast, apophysitis of the medial epicondyle presents with an insidious onset of progressively worsening pain that is localized to the medial epicondyle and associated with a loss of throwing velocity and effectiveness.[30] Pain may be elicited with a valgus stress and palpation at the medial epicondyle, but medial elbow instability is not present.[30] According to Gill and Micheli,[29] medial epicondyle apophysitis occurs instead of medial epicondylitis is most commonly experienced in the skeletally immature thrower.

Ulnar collateral ligament injuries in the adolescent thrower are uncommon.[30] Singh[27] asserts that ulnar collateral ligament laxity may be seen in asymptomatic people, and that there is greater laxity in the nondominant elbow. This finding contradicts Ellenbecker[15] and Eygendaal[22] who found that the throwing elbow demonstrated significantly more medial laxity than the nondominant elbow.

Ulnar neuritis can be present with medial epicondyle avulsion fractures, but the incidence of ulnar neuritis increases with age and the number of pitches.[29] Ulnar neuritis is characterized by paresthesias along the medial aspect of the forearm into the ring and little finger. The thrower may also complain of a weak grip and hand fatigue.[8]

In order to determine the pathology affecting the overhead athlete, impairments in the cervical, thoracic, and scapulothoracic regions must be considered in addition to impairments found in the upper extremity. Impairments in the spine, such as upper thoracic stiffness, could contribute to injury to the upper extremity, since the scapular rotators would be at a mechanical disadvantage if the thoracic spine could not extend sufficiently.[31] Likewise, shoulder impairments could contribute to injuries found in the elbow, forearm, and wrist since the shoulder transfers the kinetic energy generated by the body to the wrist and hand via the elbow. The purposes of this case report is to: (1) describe the findings from an examination of a young baseball pitcher with medial elbow pain that also includes assessment of impairments in the thoracic and shoulder regions, and (2) describe an intervention that includes active exercise and modification of functional activities to minimize the impact of impairments in these regions.

CASE DESCRIPTION

The patient is a 15-year-old right-hand dominant male competitive high school pitcher referred to physical therapy with a diagnosis of medial epicondylitis of the right elbow. Informed consent for treatment was obtained from the patient's father and the privacy rights of the subject were protected.

Chief Complaint

The patient reported an insidious onset of medial elbow pain nearly 2 months prior to beginning physical therapy, but admitted to previous similar episodes over the past 9 months. He reported that he was unable to throw a baseball without pain despite 3 weeks of rest.

Aggravating Factors

He reported that his medial elbow pain began immediately, but only with throwing. He denied pain at rest, and symptoms would dissipate soon after ceasing any throwing.

Previous Intervention

Previous interventions consisted of rest and NSAIDS as prescribed by the patient's primary care physician. The patient denied any functional improvement with these interventions. He also denied any previous physical therapy intervention for his right elbow pain.

Functional Disability

At the time of the examination, the patient was between seasons, but preparing to train for a place in the starting pitcher rotation on his school's junior varsity team. However, this competitive high school pitcher was unable to play or practice because of complaints of medial elbow pain during throwing.

Physical Examination
Initial observation and structural inspection

Visual examination revealed mild left thoracic scoliosis and poor postural habits in sitting. This patient had a tendency to slouch in sitting, but no forward head, rounded shoulders, or scapular malposition existed when the patient sat up straight.

Past medical history and history of present condition

The patient's past medical history was clear of any known concurrent disease states or pathology. His father denied any recent growth spurts. The patient reported a 9-month history of medial elbow pain, which began insidiously while training for the previous baseball season. He admits to changing his ball release technique around that time to improve his control. He denied any single incident of trauma.

Palpation for condition

Palpation and visual inspection of the right elbow did not reveal any edema, ecchymosis, muscle atrophy, or integumentary findings.

Cervical spine screening

The patient's cervical spine was assessed in supported sitting using the procedures described by McKenzie[32] and Magee.[7] His cervical spine range of motion was full and painfree and he did not have any significant findings at the cervical spine to justify additional testing.

Active Range of Motion Testing

Shoulder AROM was assessed with the patient standing. Shoulder flexion, abduction, internal rotation, and external rotation were all full and painfree. Bilateral scapular motion during elevation was symmetrical and no scapular dyskinesis was detected. The elbow and forearm demonstrated full and painfree AROM. Repeated pronation and supination motions had no effect on symptoms. He denied any joint

locking, but did complain of elbow stiffness. The wrist and hand demonstrated full and painfree AROM.

Passive Range of Motion Testing and Accessory Motion

Passive range of motion was assessed using the procedures described by Norkin and White[33] and accessory motion was assessed using the methods described by Patla.[31] Passive range of motion and accessory motion at the shoulder and elbow were within normal limits bilaterally.

Muscle strength and length

Upper quarter muscle length and strength were assessed according to the procedures described by Kendall.[34] Passive length of the pectorals and wrist flexors was decreased bilaterally, and stretching of the wrist flexors provoked discomfort bilaterally. External rotation strength of the shoulder was 4+/5 bilaterally. Internal rotation strength of the shoulder was 4+/5 on the left and 5/5 on the right. Biceps strength was 5/5 bilaterally. Middle trapezius strength was 4/5 bilaterally. Strength testing of the flexor digitorum superficialis and flexor digitorum profundus was 5/5 bilaterally. Wrist flexion was of normal strength and painfree on the left, but strong and painful on the right.

Special tests

Both glenohumeral joints did not demonstrate any detectable instability or impingement signs using the procedures described by Blackburn et al[14] and Magee.[7] Ligamentous instability tests were performed on the medial and collateral ligaments of both elbows, as described by Magee.[7] Testing of the medial collateral ligament at 30° of elbow flexion did produce pain on the right but not on the left. No laxity of either ulnar collateral ligament was detected.

Palpation for tenderness

The pronator teres was locally tender to palpate, the dominant elbow more sensitive than the nondominant.

Radiological testing

The patient reported that plain film radiographs of his elbow were negative for any significant findings. No MRI was performed or planned.

DIFFERENTIAL DIAGNOSIS

The patient's key impairments were medial elbow pain, rotator cuff and scapular stabilizer weakness, pain with valgus stress testing of the elbow, and pain with resisted wrist flexion. Because of his age and presentation, ulnar neuritis and ulnar collateral ligament insufficiency were unlikely. Moreover, no ulnar collateral ligament laxity was detected at either elbow. Since his symptoms were insidious in nature and that since he did not present with limited elbow AROM, swelling, and any positive radiographic findings, a medial epicondyle avulsion fracture was ruled out.

His presentation of medial elbow pain, tenderness at the medial flexor-pronator muscle mass, absence of laxity despite a positive valgus stress test suggested medial epicondylar apophysitis. This condition could have resulted from overtraining, from changing his ball release technique, or weakness of the rotator cuff and scapular stabilizers to properly decelerate the throwing arm. According to Field and Savoie, the most common cause of elbow injuries in throwing athletes is overtraining.[35] The prognosis for this injury was good to excellent because of his presentation and because this condition typically responds well to conservative management.[29]

The patient's goals in physical therapy were to be able to throw without pain and return to competitive play.

INTERVENTION

The primary focus of the intervention is, as follows: (1) to resolve muscular imbalances found at the elbow and shoulder; (2) to resolve behavioral aspects leading to impairment, such as poor postural habits; and (3) to return the athlete to competitive play.

Immediately following the examination, the patient was instructed in home exercises that addressed the identified impairments. However, no more than 4 exercises were instructed at a single therapy session so that the patient had time to learn the exercises and perform them properly. The focus of the home exercise program was to recover throwing function, increase the strength of the scapular stabilizers and rotator cuff muscles, and improve the length of the wrist flexors.

In addition, the patient received instruction on his upper extremity pathology and how to self-manage his symptoms. Instructions on proper sitting posture and how posture related to function were also given. The therapeutic exercise program is outlined in Table 1.

Early Modification of Functional Activities

The patient was prohibited from participating in any games or practices for the first 3 to 4 weeks of therapy. He was not allowed to perform throwing at any intensity to allow the medial elbow inflammation to resolve, to improve the flexibility of the wrist flexors, and to improve the strength of the rotator cuff and scapular stabilizers.

OUTCOMES ACROSS INTERVENTION PERIOD

This patient was seen for a total of 11 visits over 11 weeks from December, 2001 to March, 2002.

Week One

Week one consisted of the initial examination and treatment and the patient's first follow-up visit. On the first follow-up visit, the patient was instructed on prone shoulder extension, prone shoulder horizontal abduction with external rotation, and wrist flexor stretching. No weights were used during the instruction of the prone exercises to ensure proper technique and to determine level of fatigue without resistance. The patient was instructed to perform all exercises with the same number of repetitions and sets on both upper extremities. Initially, the patient performed the prone exercises 2 sets of 20 repetitions daily, and wrist stretching 2 to 3 minutes twice daily, using the concept of low load and prolonged duration.[31] The UBE was used as a warm-up before exercising and to help maintain upper extremity conditioning. Education on the patient's pathology and proper posture according to McKenzie[32] was included to help ensure compliance with postural instructions and the home program.

On the second visit, prone 90-90 external rotation, prone rows, table push ups with a plus, and theraband external rotation were instructed in the clinic and added to his home program. All prone exercises were progressed from no weight to 2 pounds, since the patient demonstrated good technique and minimal fatigue. Exercises were progressed from repetitions to fatigue to ensure that the patient was working sufficiently to promote strength gains and to avoid plateauing. No changes in symptoms were reported during week one and the patient continued to be prohibited from throwing.

Table 1. Therapeutic Exercise Program[39,40,42]

Execises

- Prone shoulder extension*
- Prone shoulder abduction with external rotation*
- Prone row*
- Prone 90-90 external rotation*
- Supine PNF D2 flexion/extension (manual/self)*
- Supine rhythmic stabilization of serratus anterior
- Seated UBE forward/backward (warm-up)
- Seated wrist flexion stretch*
- Seated wrist extension*
- Seated thoracic extension stretch/AROM*
- Standing triceps kick backs*
- Standing biceps curls*
- Standing chest pass with plyoball
- Standing resisted throwing with theraband*
- Standing shoulder external rotation with theraband*
- Standing table push-ups with a plus*
- Standing throw/catch with plyoball

*indicates exercise is part of the home program

Week Two

Week 2 consisted of 2 visits. Bicep curls, triceps kick-backs, and wrist extension against resistance were added to help maintain upper extremity strength. Wrist flexion against resistance was not added to avoid exacerbating his elbow symptoms. Six-inch medicine ball plyometric chest pass against a rebounder and D2 flexion and extension in supine against manual resistance was initiated to help train upper extremity motor control and maintain upper extremity strength. No changes in symptoms were reported, and the patient denied pain since he was not throwing. He reported compliance with his home program, which was progressed to 4 pounds of resistance.

Week Three

Week 3 consisted of 2 visits. Throwing activities were initiated by progressing plyometrics to throwing and catching with the dominant arm. Theraband resisted 90/90 (abduction/external rotation) throwing motions were also initiated with green theraband. The patient tolerated these activities without any complaints of discomfort. If these exercises were painfree for one week, the patient was allowed to try light to moderate intensity throwing activities (up to 50% of max effort). The home program was progressed to 5 pounds of resistance.

Week Four

Week 4 consisted of one visit. He reported tolerating 50% to 75% throwing effort without complaints of discomfort. Rhythmic stabilization of the right serratus anterior was initiated with the patient supine with eyes open and closed to help train proprioception and upper extremity control. No progression of the home program was made. He continued to report compliance with the home program and with postural instruction.

Week Five

Week 5 consisted of one visit. The patient reported a subjective overall improvement of 75%. He denied pain with moderate intensity throwing (50-75% of maximum effort). Internal rotation manual muscle testing was improved to 5/5 bilaterally and external rotation was improved to 5-/5 bilaterally. The patient was to continue his current program for 2 weeks, and he was instructed to have his coach examine his throwing form for proper mechanics.

Week Seven

Week 7 consisted of one visit. He reported that he could throw fastballs at full effort without any pain. He did complain of decreased external rotation AROM in the arm cocking phase. An examination of his upper thoracic spine revealed painfree but limited extension, especially from T1-T4. The patient was instructed in thoracic extension AROM in sitting as described by McKenzie.[32] Grade II posterior to anterior oscillations were performed on T2-T6 with the patient prone.[32] The patient was instructed to continue his current program for 2 more weeks. If he continued to remain painfree, he was instructed that he could return to play with clearance from his physician.

Week Nine

Week 9 consisted of one visit. He had returned to competitive play without complaints of discomfort, except for one episode where he complained of pain from an insufficient warm-up prior to pitching. He reported 90% improvement overall, with improved pitching velocity and tolerance of 100 to 120 pitches. He still demonstrated limited external rotation AROM with his throwing arm. He continued to report compliance with his home program, which was reduced to every other day.

Week Eleven

Week 11 consisted of one visit. The patient reported 100% improvement. He denied pain with throwing and he had returned to competitive play. Due to the repetitive and cumulative nature of his sport, the patient was instructed to return to his physician and resume physical therapy only if his symptoms returned.

Follow-up

Approximately 2 months after discharge from therapy, the patient presented to the clinic with a game ball from a recent victory. On the ball, he had recorded the score and his statistics, which are as follows: 7 innings pitched no hits, no runs, 3 walks, 10 strikeouts, and 110 pitches. Underneath his stats, he wrote 'no-hitter (no pain)—Thanks, Pete' and signed the ball.

A follow-up phone call was made to the patient's home in February 2005. After high school, he continued to pitch in a local 16- to 19-year-old league without complaints of elbow discomfort.

DISCUSSION

Differential diagnosis for this patient was based on the process of elimination. The author believed that the etiology of the medial elbow pain was not due to neurological or ligamentous involvement. In addition, the author believed that the source of the pain arose from impairments at the shoulder and at the elbow.

While the shoulder is inherently mobile, it is not inherently stable. The hemispheric-shaped humeral head is 2 to 3 times the size of the shallow glenoid, allowing for significant amounts of motions in all planes.[18,19] Dur-

ing overhead throwing, the elbow tended to be in open-packed position while the glenohumeral was nearing its closed packed position, transferring more forces to the elbow. In an open-packed position, bony congruence at the elbow has maximally decreased while tension on ligamentous support has significantly increased. Therefore, during the throwing cycle, both the shoulder and the elbow must rely heavily on dynamic stabilization of muscles to protect their static stabilizers.

The concept of proximal stability before distal mobility was evident in this case. Rotator cuff and scapular stabilizer weakness caused the elbow pain, since the shoulder was unable to properly transfer forces during acceleration and attenuate these forces during deceleration. Moreover, the patient's tight flexor-pronator mass could have resulted from changing his release technique.

Although the patient presented with only elbow and not shoulder pain, the focus of the intervention was on the shoulder and the elbow/forearm complex together. By identifying the key impairments throughout the upper extremity, the author was able to design a comprehensive program to resolve the patient's symptoms and disability. It was doubtful that the patient's improvement was through passage of time, since rest and NSAIDs had not worked for 9 months prior to initiating therapy.

The patient presented in this case demonstrated muscle imbalances around the shoulder and around the elbow/forearm complex. Janda[36] predicted that certain muscles, based on their function, would either tighten or weaken in the presence of joint dysfunction. He described 2 general muscle function types as follows: tonic and phasic. Tonic muscles are typically large muscle groups that function to support the skeleton against gravity. On the other hand, phasic muscles are smaller muscle groups that are recruited occasionally to perform functional tasks, such as reaching overhead. Janda asserted that tonic muscles tend to become tight, while phasic muscles tend to become weak.[31,36,37]

Table 2 provides some examples of tonic and phasic muscles in the upper extremity. In the shoulder complex, the large internal rotator muscles tend to be strong and tight. The small rotator cuff muscles and scapular stabilizers—which are the middle and lower trapezius, rhomboids, and serratus anterior—tend to be much weaker. The imbalances around the shoulder are readily apparent. The shoulder can become more rounded from the tonic muscles that tighten while the scapular stabilizers and rotator cuff becomes functionally weaker from the resulting passive insufficiency.

Table 2. Janda's Tonic and Phasic Upper Extremity Muscles Compared with the Patient's Presentation. Adapted with permission from Grodin and Cantu.[37]

Tonic/tight	Phasic/weak	Patient Presentation
Upper trapezius	Latissimus dorsi	Upper trapezius strong and tight (performed in cervical screen)
Pectoralis major Pectoralis minor	Middle trapezius Rhomboids Lower trapezius	Pectorals tight, bilaterally Middle trapezius weak, bilaterally
Subscapularis	Infraspinatus Teres minor	Internal rotators strong at RUE External rotators weak, bilaterally

The findings of Wilk et al[38] support Janda's theory in the overhead thrower. They found that that the supraspinatus muscle was weaker in the throwing arm compared to the nonthrowing arm. Moreover, the external rotation strength of a pitcher's throwing arm is significantly weaker than the nonthrowing shoulder by 6%, while internal rotation strength was significantly stronger than the nonthrowing shoulder by 3%.[38]

Taking Janda's theory a step further, tonic muscles are not only tight, but they are also resistant to stretch. These muscles have some activity whenever gravity applies a certain degree of resistance to the body, such as the caudal pull on the upper extremity when an individual is standing. Even while the upper extremity is stationary, it is likely that the tonic muscles have some contractile activity to counter the effects of gravity according to Janda.[36] Therefore, tonic muscles can be overtrained to the point where they resist the lengthening effects of stretching exercises. For example, pectoral group stretching may temporarily reduce the symptoms associated with muscle tightness and delayed onset muscle soreness, but will not result in significant permanent muscle lengthening.

Applying Janda's concepts to intervention for the overhead thrower, the exercise prescription was simplified. Specifically, the internal rotators that are already strong and tight should not be further strengthened. Likewise, stretching these muscles does not significantly improve their flexibility. To the contrary, typical pectoral stretching requires the patient to put the upper extremity in positions that risk glenohumeral joint instability.

Even after an injury where both the internal rotators and external rotators appear weak, the internal rotators will still be significantly stronger than the external rotators. Moreover, gym equipment typically overemphasizes strengthening of the tonic muscles and tends to neglect the phasic muscles, such as the rotator cuff. Instead, the external rotators and scapular stabilizers should be strengthened in order to restore more of a functional balance between the internal and external rotators. Restoring this balance is critical to a successful outcome in shoulder and elbow rehabilitation.

Several studies suggest exercises for the rehabilitation of the shoulder and elbow in the overhead thrower.[14,19,21,28,39-41] Yet, few authors provide enough detail in their rehabilitation programs to enable the reader to produce a home program for the overhead athlete. Moreover, a consensus on which exercises are essential or most beneficial does not exist. The exercises used in this case report come from the EMG studies by Moseley et al[39] and Townsend et al[40] because these exercises target the scapular stabilizers and short rotators of the shoulder. The use of PNF and plyometrics trains both proprioception and power.[42]

Patla[31] advocates manual therapy for the upper thoracic spine to enhance shoulder mobility. With a stiff upper and mid thoracic spine, it becomes difficult to recruit the middle and lower trapezius.[31] Moreover, AROM into extreme shoulder abduction and external rotation, required of baseball pitchers, becomes difficult with thoracic stiffness. Thoracic extension mobilization, or posterior to anterior glides, were initiated on the upper and mid thoracic spine when the patient presented with limited external rotation AROM.

Behavioral issues also contribute to this imbalance. Poor postural habits allow the tight internal rotators to tighten further since they are placed in a shortened position, and the external rotators are put further into passive insufficiency. Slouch sitting is a failure to correct posture and activate the proper musculature to counteract the effects of gravity. In this manner, the muscles that are already weak become weaker from lack of activation. Thoracic kyphosis and rounded shoulders are therefore promoted, which will eventually limit the ability of the athlete to extend the upper and mid thoracic spine, making overhead throwing more difficult or less efficient.

Wilk et al[38] discussed how the rounded shoulder posture can affect an overhead thrower. Rounded shoulder posture caused protraction and anterior tilting of the scapula, and as a result, the lower trapezius became weak and the pectorals became tight.[38] The lower trapezius has been important in arm deceleration since it controls scapular elevation and protraction. The combination of weak scapular stabilizers and weak rotator cuff hampers the thrower's ability to properly accelerate and decelerate the upper extremity, allowing for excessive transmission of forces to distal structures.

CONCLUSION

This patient's elbow symptoms and disability were resolved by identifying key impairments throughout the upper extremity and addressing these deficiencies through exercise and education. Knowledge of upper extremity anatomy and throwing mechanics is critical for differential diagnosis and the selection of proper exercises. Proximal stability before distal mobility was a concept that readily applied to this patient. This case report demonstrated that intervention for medial elbow pain should include intervention directed at shoulder and spinal impairments.

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Nominating Committee Announces Election Results

Committee members Pam Duffy (Chair), Kyndy Boyle, and Paul Howard met by conference call during summer 2006 to determine slate of candidates for elections to the offices of President, Vice President, and Nominating Committee.

- Number of Ballots Cast: 908
- Number of Valid Ballots: 896
- Number of Invalid Ballots: 12

The slate of candidates was:

President: Jay Irrgang and William O'Grady
Vice President: Thomas McPoil (incumbent)
Nominating Committee: G. Kelley Fitzgerald and Jennifer Gamboa

The elections were conducted online and mail ballot upon request and coordinated by the Section office.

The results of the election are:

- **President**
  Jay Irrgang: Elected
- **Vice President**
  Thomas McPoil: Elected
- **Nominating Committee Member**
  G. Kelley Fitzgerald: Elected
- All 9 Bylaw Amendments were approved.

The committee thanks all Section members who consented to serve in elected office. The entire Section appreciates their continued generosity of time and talents and their commitment to the Section.

Manual Therapy for a Patient Diagnosed with Multilevel Cervical Spondylosis: A Case Report

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ABSTRACT

Background and Purpose: The use of manual therapy in the treatment of cervical spondylosis is not widely reported in the literature. The purpose of this case report is to describe the management of a patient with cervical spondylosis with an emphasis on manual therapy techniques. **Case Description:** The patient was a 56-year-old female who worked in a hospital blood lab and complained of frequent headaches and neck pain. She had limitations with cervical ROM, strength, and an elevated Neck Disability Index (NDI) and a lower SF-12 score. **Intervention:** Treatment consisted of modalities, therapeutic exercise, and manual therapy. **Outcomes:** By the 5th visit the patient demonstrated meaningful changes in cervical ROM, pain, and scores on the SF-12, and NDI. **Discussion:** The use of manual therapy along with therapeutic exercise may have prevented the patient's condition from progressing and it may have also prevented or prolonged the need for surgical intervention. More research is needed to investigate the unique contribution of manual therapy in treating patients with similar physical therapy diagnoses.

INTRODUCTION

Cervical spondylosis is a disorder that is caused by abnormal wear on the cartilage and cervical vertebrae and leads to degeneration of the vertebral discs and facet joints. The development of osteophytes, or bone spurs, on the vertebrae can impinge on the blood supply to the vertebrae. These degenerative changes may also cause ligaments to lose some of their strength. Degeneration can gradually compress the nerve roots especially with spinal extension and side bending, resulting in increased pain, weakness, decreased range of motion, and decreased sensation in the neck and arms.[1]

The disorder occurs in middle-aged or elderly patients and may cause neck pain syndromes, radiculopathy, or myelopathy. Spondylosis may be a result of congenital bony anomalies or it may be due to a previous traumatic injury several years prior. An acute exacerbation may be a result of flexion extension injuries, blows to the head, or a neck injury while lifting heavy objects. The major risk factor, however, is aging. Sixty percent of people older than 45 years old and 85% of those older than 60 years old have cervical spondylosis.[2] X-rays are of limited diagnostic value because degeneration changes are present in both symptomatic and asymptomatic patients. Although a narrow sagittal diameter of the spinal canal measuring 10 to13 mm has been associated with a higher incidence of neurological deficits.[3] The structural alterations from degeneration may also decrease disc height and increase the risk for disc herniation. The highest level of disk degeneration was found to be at C5/C6 followed by C6/C7 and C4/C5.[4] Furthermore, men show signs of disc degeneration about a decade earlier than woman.[5]

Conservative treatment, such as physical therapy, is successful 75% of the time.[6] Surgery may be performed if the neurological deficits become too advanced. However, the patient's age, lifestyle, occupation, and number of vertebral levels involved are taken into consideration when determining if the patient is a candidate for surgery. The treatment of cervical spondylosis depends on whether a patient presents with symptoms of myelopathy, radicular pain, or neck pain. Myelopathy is degeneration leading to compression of the spinal cord. A patient with mild myelopathic symptoms may be treated with conservative therapy that includes immobilization using a collar that holds the head in neutral or in slightly flexed position. Surgery is recommended for patients that present with moderate or severe disability. Conservative treatment for these patients only shows an improvement rate of 30% to 50%.[7] Radicular symptoms may improve with drugs, activity modification, neck immobilization, intermittent cervical traction, and isometric exercises. Surgery is indicated for these patients following a full trial of nonsurgical management that does not decrease unremitting pain and progressive weakness.[3] Neck pain from spondylosis without radicular symptoms usually respond to the same conservative treatments used for patients with radicular symptoms. Surgical treatment is not advised for neck pain from spondylosis.[8]

Manual therapy techniques are a commonly used conservative treatment for patients with cervical problems. Many physical therapists believe that manual therapy techniques are more effective than general therapeutic exercises because the goal of manual therapy is to improve motion and/or relieve pain in a specific cervical spine segment. In contrast, it may be more difficult to improve motion and/or relieve pain in a specific cervical spine segment with the use of therapeutic exercise alone. The specificity of manual therapy techniques may be more advantageous for patients with pain and motion restrictions that affect some cervical spine segments, but not others.

A literature search was conducted in May 2006 using the 'PUBMED' electronic database. Entering the following key words: 'manual therapy,' 'conservative treatment,' 'neck,' 'cervical,' and 'spondylosis' did not reveal any research that supported our contention that the exclusive use of manual therapy is an effective conservative treatment for cervical spondylosis. Therefore, the purpose of this case study was to describe the management and outcomes of a patient with cervical spondylosis that received therapeutic exercise manual therapy techniques.

CASE DESCRIPTION

History

A 56-year-old female was referred to physical therapy due to complaints of frequent headaches and neck pain. She had variable pain for over 4 years that recently became significantly worse in her upper trapezius muscle and neck 2 days after moving a filing cabinet and a heavy door at work at the end of January 2006. She is employed at a hospital where she performs lab duties and

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enters data into a computer system. The patient monitored her pain level for 2 days after lifting the cabinet but her symptoms did not subside. She then decided to visit a physician who ordered plain film radiographs of her shoulders and cervical spine. These diagnostic tests showed mild degenerative changes at bilateral acromioclavicular joints with a lesser degree at the glenohumeral joints. Severe multilevel spondylosis was present in the mid and lower cervical spine. The most significant spondylosis was found at C5-C6 and C6-C7 and to a lesser degree at C4-C5. There was also minimal anterior olisthesis of C3 relative to C4. The patient stated that the physician notified her that osteophytes were present in her x-rays. The physician prescribed her Methocarbamol, a muscle relaxant and pain reliever that is used to relieve discomfort caused by muscle injuries. The patient was then referred to physical therapy with a medical diagnosis of myofascial neck pain.[9]

Examination

The patient arrived at physical therapy approximately 4 weeks after the onset of her injury. The patient reported her neck pain as 6/10 (using the numerical pain rating scale) on an 11- point scale ranging from 0 ("no pain") to 10 ("worst imaginable pain"). She described her pain as sharp when she originally went to the doctor, but was dull and achy when evaluated at the time of physical therapy. Her pain increased with computer work and decreased with the use of a hot shower, a cold pack, muscle relaxant, and a rubbing cream (Icy/Hot®). Her pain was now intermittent and her symptoms were slightly improved since the onset of the injury. The patient had reported functional limitations with getting out of bed, picking objects up from the floor, reaching overhead, and completing daily activities outside the home (ie, shopping, driving, yard work, etc). Her past medical history included hypertension, diabetes, hypercholesterolemia, and gallbladder surgery. She reported that she smokes approximately a half pack of cigarettes a day. She had an endomorphic body type. Her goals were to eliminate her neck pain and headaches so she would be able to perform work duties that included sitting at a computer and working with blood specimens.

A gross, visual observation of the patient's posture showed a forward head on neck posture, increased internal rotation of the shoulders, moderate kyphosis of the thoracic spine, right pelvic rotation, and increased valgus posture in both knees. Her cervical ROM was measured in all 3 cardinal planes using a standard goniometer. The landmarks used to measure the ROM for neck lateral flexion were the spinous process of C7 for the axis with the stationary and moveable arms lined up with the occipital protuberance. When the patient's head was laterally flexed, the moveable arm followed the occipital protuberance to the end range. To measure cervical rotation the axis of the goniometer was placed on an imaginary point that was inline with the center of the first vertebrae. The stationary and moveable arms were aligned with the tip of the nose and the nose was followed with the moveable arm during rotation to the right and left. To measure cervical flexion and extension ROM, the axis was placed at the external auditory meatus with the arms aligned with the inferior border of the nares of the nose. The results of these measurements are shown in Table 1. The reliability of this described technique is unknown, but acceptable intertester reliability for measuring the cervical spine ROM using a similar device known as the CROM device reported as 0.70 for cervical rotation to 0.88 for cervical flexion.[10] Strength was measured using a resisted isometric muscle test grading scale ranging from 0 – 5.[2] Cervical and selected scapular muscle strength is summarized in Table 1. Her neurological screening consisted of deep tendon reflexes and superficial light touch, which resulted in unremarkable findings bilaterally.[2] The test-retest reliability of manual muscle testing is said to be acceptable for low back patients.[11] The special tests that were conducted (cervical compression, distraction, Spurling's and vertebral artery) all showed negative findings. Palpation with the patient in prone and supine positions,

Table 1. Patient Assessment and Outcomes for This Case Report

Visit #	1	5	10
Pain (NPRI) (0-10)	6	**3**	**0**
Cervical flexion ROM (Deg.) Cervical flexion strength (0-5)	48 4+	**55** N/A	**62** N/A
Cervical extension ROM (Deg.) Cervical extension strength (0-5)	35 4+	43 N/A	49 N/A
Cervical right rotation ROM (Deg.) Cervical right rotation strength (0-5)	60 4+	**69** N/A	**74** N/A
Cervical left rotation ROM (Deg.) Cervical left rotation strength (0-5)	55 4+	**60** N/A	**69** N/A
Cervical right side bending (Deg.) Cervical right side bending strength (0-5)	30* 4+	34 N/A	40 N/A
Cervical left side bending (Deg.) Cervical left side bending strength (0-5)	28* 4+	34 N/A	39 N/A
Bilateral rhomboid strength (0-5)	4	N/A	N/A
Bilateral lower trapezius strength (0-5)	4-	N/A	N/A
SF-12 Health Survey (0-100)	32.04	**43.42**	**53.17**
NDI (0-1)	0.36	**0.16**	**0.12**

Table Key
NPRI – Numerical pain rating index
ROM – Range of motion
Deg. – Degrees
NDI – Neck disability index
* - Pain with movement
N/A – Not assessed
Bold font indicates meaningful change based on SEM criterion

Table 2. Weekly Manual Techniques, Exercises, and Modalities Used

	Week 1 Visits 1-2	Week 2 Visits 3-4	Week 3 Visits 5-6	Week 4 Visits 7-8	Week 5 Vacation	Week 6 Visit 9	Week 7 Visit 10
Manual Interventions							
Ventral Glides T12-C5	Grade 3-4	Grade 3-4	Grade 3-4	Grade 3-4		Grade 3-4	Grade 3-4
Myofascial Release of Scalenes, Upper Trap & Sub-cranials	10 min	10 min	10 min	10 min		10 min	10 min
Bilateral First Rib Mobilization	Grade 3-4	Grade 3-4	Grade 3-4	Grade 3-4		Grade 3-4	Grade 3-4
Flexibility Interventions							
Corner Pec Stretch	2 X 30”	2 X 30”	2 X 30”	2 X 30”		2 X 30”	2 X 30”
Upper Trap Stretch	2 X 30”	2 X 30”	2 X 30”	2 X 30”		2 X 30”	2 X 30”
Scalene Stretch with sheet	2 X 30”	2 X 30”	2 X 30”	2 X 30”		2 X 30”	2 X 30”
Latissimus Stretch	2 X 30”	2 X 30”	2 X 30”	2 X 30”		2 X 30”	2 X 30”
Strength and Endurance Interventions							
Isometric Low traps on ball	10”	2x30”	3 X 30”	3 X 30”		3 X 45”	3 X 60”
Isometric Mid Trap/ Rhomboid on ball	10”	2 X 30”	3 X 30”	3 X 45”		4 X 45”	4 X 45”
Seated Cervical Postural Ex. (kickball)	10”	20”	2 X 30”	3 X 30”		3 x 45”	3 X 60”
Standing Cervical Postural Ex. (kickball)	10”	20”	2 X 30”	3 X 30”		3 x 45”	3 X 60”
Modalities							
Cold Pack	10 min	10 min	10 min	10 min		10 min	10 min
Moist Heat	15 min	15 min	15 min	15 min		15 min	15 min

revealed increased tenderness and muscle guarding in the scalenes (posterior, middle, and anterior) with the left side exhibiting greater symptoms than the right. There was increased tenderness of the upper/middle trapezi with left side being more symptomatic than the right. Increased tenderness and muscle guarding was also noted in the suboccipital musculature bilaterally. Joint play movements were assessed using a slide glide technique and were slightly limited with a left to right side glide motion. The patient's first ribs appeared elevated with the left side being elevated more than the right. Moderate stiffness was noted in the upper thoracic spine with ventral glides.[12] This was considered primarily a qualitative assessment as the reliability and validity of these palpatory techniques is not known, although they are commonly used in clinical situations and described in a popular clinical examination text book.[2]

The Short Form 12 Health Survey (SF-12) and the Neck Disability Index (NDI) were completed by the patient at the time of the initial evaluation, and again on visits 5 and 10. SF-12 scores range from 0 to 100 and higher scores reflected better physical and mental functioning. The SF-12 consists of 12 items drawn from the widely used Short Form 36 (SF-36) that measures general health. The reliability, validity, and responsiveness of the SF-12 have been demonstrated in various disease states, and are comparable to those of the SF-36. Internal-consistency reliability coefficients of the SF- 36 ranged from a low of 0.65 to a high of 0.94 across scales (median = 0.85).[13] The NDI is an adaptation of the Oswestry Low Back Pain Questionnaire. The index uses a 10-item scale with each question scored from 0-5 and the final score is expressed as a percentage ranging from 0% to 100% with 0% being the least amount of disability and 100% being the most.[14] The NDI has become a standard instrument for measuring self-rated disability due to neck pain. The NDI contains 6 statements that each evaluate pain, sleep quality, work ability, and various activities of daily living. High scores indicate a high level of perceived disability, and low scores indicate a low level of perceived disability. The test-retest reliability is 0.89 and the concurrent validity is 0.69-0.70 when compared to the Mcgill Pain questionnaire.[15] The first visit results on the SF-12 and NDI were 32.0 and 36% respectively.

Evaluation

Diagnosis. According to the *Guide to*

Physical Therapist Practice and after examining the patient, her signs and symptoms were consistent with that of the practice pattern of connective tissue dysfunction.[16] The patient's impairments consisted of decreased range of motion, muscle guarding, weakness, and pain. The fact that the patient's impairments were exacerbated when lifting heavy objects also follows a pattern of possible ligamentous sprain or musculotendinous strain. The examination findings did not show any of the exclusion criteria for the pattern of connective tissue dysfunction. The findings that may require classification in a different pattern include fractures, immobility due to prolonged bed rest, lack of voluntary movement, and radiculopathy.

Prognosis. The *Guide to Physical Therapist Practice* explains that a patient with a connective tissue dysfunction will demonstrate optimal joint mobility, muscle performance, range of motion, and the highest level of function in the home, community, and work environment in about 2 weeks to 6 months.[16] A range of 3 to 36 visits is expected for these patients. It is anticipated that 80% of patients who are classified into this pattern will achieve the anticipated goals and expected outcomes with in this range of visits.[16]

Intervention

The patient was treated for 11 visits over a 7-week period. On the first visit the patient was educated on keeping a neutral cervical posture alignment when in a standing and a seated position.[17] The patient was instructed on how to keep from sitting in a forward head posture position. The patient was told to keep her chin tucked so that her ear is in line with her shoulder. The patient was educated on proper posture positions, because many therapists believe that with proper posture, less stress is placed on the tissues surrounding the spine. The patient was treated with moist heat for 15 minutes at the beginning of each session as it is believed that moist heat may increase blood flow to the cervical region.[18] The physical therapist then performed manual therapy techniques which included: myofascial techniques to the scalenes, upper trapezius, and suboccipital muscles as described by Cantu, [19] and grade 3 and 4 joint mobilizations of the cervical and thoracic vertebrae as well as first rib inferior mobilizations as described by Maitland.[20] Theoretically, myofascial techniques help to decrease adhesions of tissues and can influence the healing process.[19] Restrictions were located by use of palpation prior to performing any myofascial techniques to the patient's cervical area. This was performed by moving the skin of the patient's neck and assessing if an area did not move as well as other areas. Next the muscles were palpated and assessed for any areas that were not pliable or sensitive to palpation. Once areas of restriction were found, the superficial fascia was released using the index and middle fingers. The fingers were aggressively pressed into and slid over the affected region of skin and into the muscles following the grain of the muscle. This was performed for approximately 3 to 5 minutes over each area of restriction. To perform grade III and IV joint mobilizations or glides to the cervical and thoracic vertebrae an oscillatory motion was used with the patient in a prone position on a table with cervical spine in a neutral position. A grade III mobilization is considered a large amplitude movement that goes to the limit of the range and a grade IV mobilization, is a small amplitude movement at the limit of range. Using the palm of the hand, the cervical and thoracic vertebrae were assessed. Beginning from T12 the palm of the hand was used to assess the posterior to anterior movement of each vertebra up to C7. Once the palm reached C7 the cervical vertebrae were assessed by having the examiner place the thumbs on top of each other. A posterior to anterior force was applied to each vertebrae at the spinous process to assess for motion restriction. When a segment lacked motion, a grade III to IV oscillatory posterior to anterior force was used on the segment for 1 to 2 minutes to help regain the mobility in that segment. A first rib mobilization was also performed. When performing the first rib mobilization, the examiner stood behind the seated patient. The examiner then fixated the first rib anterior-laterally with the radial border of the MCP joint of the index finger of one hand while applying overpressure with the other hand to the head after the patient side flexed away (Figure 1). According to Mulligan this technique usually eliminates the patient's pain after a few repetitions.[21] Following manual therapy the patient performed general stretches to increase flexibility of the scalenes, upper trapezius, pectoralis major and minor, and latissimus dorsi muscles. She also was prescribed isometric strengthening exercises to improve postural alignment. Isometric exercises are important to help stabilize the newly aligned joint positions that were obtained using manual techniques. She performed standing and seated isometric cervical extension with capital flexion exercises using a kickball against the wall while simultaneously doing scapula retraction isometrics (Figures 2 & 3). The patient also performed prone isometric scapular stabilization exercises using lightweight dumbbells (1 lb.) on a 55cm exercise ball to increase strength and endurance of her mid/low trapezius, rhomboids, and rear deltoids. She was instructed to do isometric holds based on the premise that the exercise may increase tonic firing of type I endurance fibers, to facilitate muscle endurance, and improve posture. However, no research was found that showed that the isometric holds do in fact increase firing of the type I fibers. At the end of each session the patient received a cervical cold pack

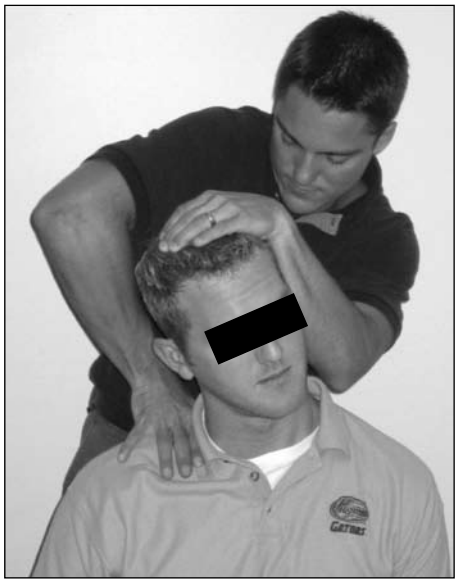

Figure 1. First rib mobilization.

Figure 2. Seated isometric cervical extension with capital flexion.

Figure 3. Standing isometric cervical extension with capital flexion.

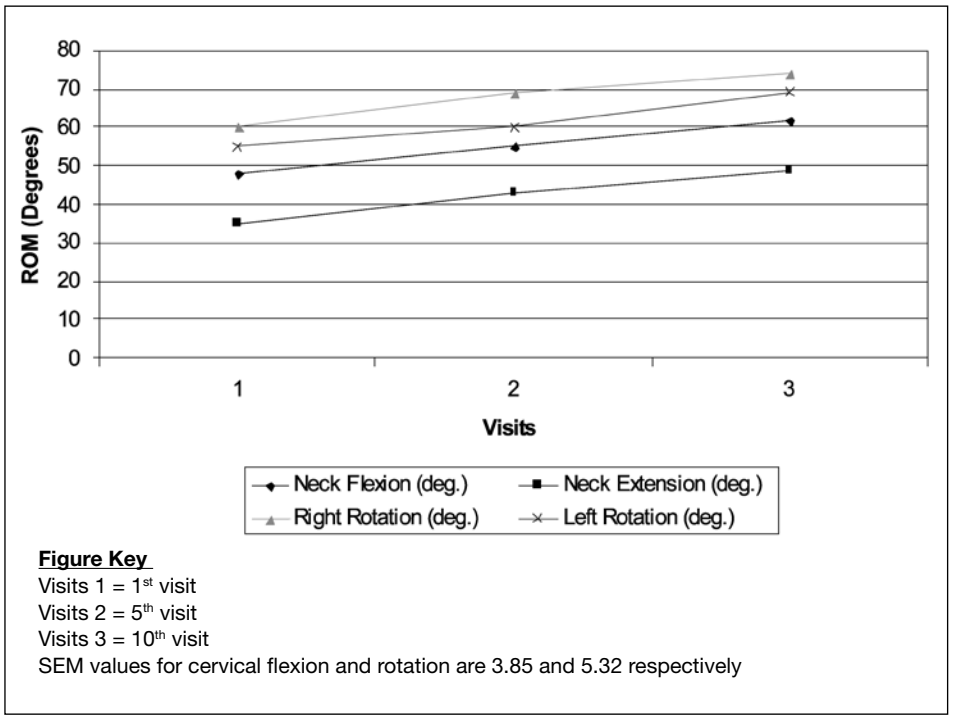

Figure Key
Visits 1 = 1st visit
Visits 2 = 5th visit
Visits 3 = 10th visit
SEM values for cervical flexion and rotation are 3.85 and 5.32 respectively

Figure 4. Summary of cervical range of motion progression.

(CP) for 10 minutes, to control inflammation, pain, edema, and reduces spacticity.[18] A summary chart of each intervention is shown in Table 2.

Outcome

Data for all outcome measures was collected on the 1st, 5th, and 10th visits. The impairment measures used included measurement of pain intensity (using the numerical pain rating scale), and ROM of the cervical spine (using a standard goniometer). The SF- 12 and the NDI were also administered. These outcome measurements are reported in Table 1.

The minimal clinically important difference (MCID) for change in pain intensity has been described as 2 points.[22] The patient's goal of eliminating pain was met with meaningful decreases in pain intensity from 6/10 at the initial evaluation to 3/10 at visit 5, and another decrease to 0/10 on visit 10. A meaningful increase in cervical ROM for neck flexion and rotation was also observed during treatment (Table 1, Figure 4). The cervical ROM SEM (standard error measurement) was calculated using the CROM reliability values for neck flexion and rotation and resulted in 3.85 and 5.32 respectively.[10] A meaningful increase in cervical flexion and right and left rotation was evident from the first visit to the last visit (Table 1). The psychometric properties of the SF-12 is comparable to that of the SF-36, and therefore SF-36 data was used to calculate the MCID values. The SEM of the SF-36 was calculated using the reliability reported earlier of 0.85 and the calculated average of the reported standard deviations (8.1 and 11.6) of the physical and mental portions of the SF-36 for patients with subacute cervical impairments.[10] The SF-12 outcomes illustrated that meaningful improvements had taken place with the patient's general physical and mental health as seen from visit 1 with a score of approximately 32 to visit 10 with a score of approximately 53. Meaningful improvements were also noted using the NDI with an SEM of 4.7% for subacute cervical patients.[10] The first measurement was 36% and the final was 12% depicting a meaningful decrease in self-rated disability. Her score of 36% placed her in the moderate disability category on visit 1. Her score decreased to 16% on visit number 5 and she had a score of 12% on her 10th and final visit, placing her in the minimal disability category.

DISCUSSION

The patient's goals were taken into consideration when planning the treatment strategy. Her goals were to perform work duties such as sitting at a computer without headaches and neck pain. It was determined that the interventions used would prepare her for the physical demands that would be required for these work-related activities. After examining the results of the outcome measures they demonstrated improvement in the patient's status for ROM, pain level, general health, and disability levels. In addition, her headaches had occurred less frequently, presenting only one time a week compared to several times per day and she was able to perform all daily activities including work duties without any pain. Upon meeting all her goals the patient was discharged after her tenth visit. It was not appropriate to conclude that the patient's positive outcomes were solely due to the manual therapy techniques performed because the patient also received cervical modalities, ROM, and strengthening exercises.

The purpose of this case study is to describe the management of a patient with cervical spondylosis with an emphasis on manual therapy techniques. The interventions used may help to prevent surgical intervention. The indications for surgical intervention are the presence of unremitting pain of radicular origin and progressive weakness despite a full trial of conservative management. Neck pain and radicular symptoms caused by cervical spondylosis generally resolve with conservative treatments.[3] There is some research evidence to support the use of manual therapy when combined with other interventions but no studies showed an improvement of outcomes when manual therapy was used as the sole form of intervention.[23] All the research that was found

integrated other interventions with manual therapy. These interventions included: drugs, education, exercise, and modalities. For mechanical neck disorders with or without headache, it appears that, manual therapies can be an integral part of treatment for improving pain and patient satisfaction.[23]

For this patient manual therapy techniques consisting of the first rib mobilization, ventral glides of T12-C5, and myofascial techniques helped increase the patient's joint alignment and decreased her pain. As a result, we believe the aligned joints provided the patient with the opportunity to more successfully perform and benefit from the exercises that related to her functional work duties. A good anecdotal example of an exclusive benefit of manual therapy was when the first rib mobilization was used on the patient's left elevated rib. The rib may have been elevated due to a secondary impairment of the patient's spondylosis. The patient claimed the technique decreased her neck pain almost immediately. It was performed many times over the 10 visits, because the patient complained of neck pain when she rotated her head to the right and because the first rib was elevated. It was believed that the shortened scalene lifted the rib when the patient laterally flexed her head through out the day. It seemed that once the scalene was lengthened muscle guarding reduced and the rib no longer was in an elevated position.

An appropriate research question that arises from this case report is, "Can manual therapy be a useful and unique adjunctive treatment in preventing or prolonging surgical intervention for patients with cervical spondylosis?" The answer to this question is currently unknown. Future research efforts are needed to determine the role of manual therapy in the management of cervical spondylosis. Future research should employ a randomized controlled clinical trial design using subjects diagnosed with cervical spondylosis. The subjects should be grouped into 4 groups whereby each group would receive different treatment interventions. The treatment groups should include a manual therapy only group, manual therapy and exercise group, exercise only group, and a control or placebo/sham manual therapy group. The outcome measures for this study should include the assessment of pain, cervical ROM, strength, sensation, and administration of the SF-12, and the NDI scales. The outcomes should be assessed every 3 weeks during the treatment and then 6 months after discharge.

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Treatment of a Young, Male Patient with Left Upper Arm Pain and Left Arm Numbness: A Case Report

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Victor DeRienzo, PT[2]
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ABSTRACT

Background and Purpose: The purpose of this case report is to describe the diagnosis and conservative treatment for a young, male patient with neuromuscular symptoms. The numeric rating scale (NRS) for pain intensity; observation of first rib mobility; the Disability of the Arm, Shoulder, and Hand Questionnaire (DASH); and the Veterans Rand 12-Item Health Survey (VR-12) were used as outcome measures. **Case Description**: The patient was a 33-year-old right-handed Caucasian male who was referred for physical therapy by his primary care physician for evaluation and management of 'left upper arm pain' and 'left arm numbness.' **Outcome**: Meaningful change was found with the NRS and the VR-12, but not with the DASH. Qualitative observation and assessment of first rib mobility demonstrated normal motion after 9 treatment sessions. **Discussion**: The patient presented with signs, symptoms, and diagnostic findings that were consistent with nonspecific TOS. Although cause and effect cannot be inferred, conservative treatment was implemented and appeared to have benefited Mr. E.

Key Words: thoracic outlet syndrome, exercise, posture, joint mobilization, nerve glide

INTRODUCTION

Thoracic outlet syndrome (TOS) is caused by compression of the neurovascular bundle, consisting of the brachial plexus trunks and subclavian vessels, resulting in pain, weakness, numbness, and/or tingling in the upper extremity.[1,2] Three possible anatomic spaces that could compress the neurovascular bundle include the interscalene triangle, costoclavicular triangle, and the subcoracoid space.[2] Anatomic anomalies, such as a cervical rib, extra fibrous bands, muscular abnormalities, or a history of rounded shoulders and forward head posture are believed to increase susceptibility of developing TOS.[2,3] Thoracic 'outlet' is misnamed and should technically be referred to as thoracic 'inlet.'[2,3] The term 'thoracic outlet syndrome' was coined by Peet in 1956.[4,5]

The incidence of TOS ranges considerably, from 3 to 80 cases per 1000 people.[2] Patients with TOS are more often female than male with ratios as high as 9:1. The age of incidence peaks during the fourth decade of life.[3] Thoracic outlet syndrome is divided into 3 categories: (1) neurogenic, or compression of the brachial plexus; (2) vascular, or compression of the subclavian artery or vein; and (3) nonspecific (common) TOS, or unexplained pain that occurs in the arm, scapular region, and cervical region.[2,3] Nonspecific TOS is the most commonly occurring form which accounts for 90% of all TOS surgeries.[3,6] Unlike TOS with true neurogenic or vascular origin, the etiology of nonspecific TOS is typically unknown and symptoms do not follow neurologic patterns.[2,6]

Thoracic outlet syndrome remains a controversial topic as there is a lack of objective criteria to diagnose this syndrome and no consensus for optimal treatment. Nerve conduction studies (NCV), electromyographies (EMG), MRIs, and radiographs can help to determine true neurogenic TOS. Treatment would include first rib resection if conservative management fails. Vascular TOS can be determined using venograms, arteriograms, and magnetic resonance imaging (MRI). If positive, vascular TOS can be treated with surgical decompression of the subclavian vessels. Conservative treatment in this case may not be of help. Normal NCV and EMG would indicate nonspecific TOS, in which case conservative management is still attempted. Surgery is indicated only as a last resort.[2] Provocative tests, such as the Adson and Roo Test, may be used to help determine nonspecific TOS, but these tests have been shown to have low sensitivity and specificity.[3] There is no 'gold standard' for diagnosis of nonspecific TOS. A thorough history and physical examination are the best tools for diagnosing TOS.[2] Signs and symptoms of TOS are similar to other pathologies. Differential diagnosis must consider adhesive capsulitis, carpal tunnel syndrome, cervical disc disease, complex regional pain syndrome, fibromyalgia, rheumatoid arthritis, multiple sclerosis, and vasculitis.[2,3] In general, these diseases are ruled out before TOS is considered.

Conservative treatment of the signs and symptoms of TOS is commonly recommended before surgery becomes an option. Complications from the surgical option may be severe and favorable results occur in less than 40% of all cases.[3,4] However, positive results have also been reported. One study found that 93% of patients who had TOS surgery had complete or partial relief of symptoms after 12 months.[5] There is limited research on the long-term effectiveness of treatment for TOS and considerably less research for conservative management.[4] The purpose of this case report is to describe the diagnosis and conservative treatment for a young, male patient with neuromuscular symptoms. The numeric rating scale (NRS) for pain intensity; observation of first rib mobility; the Disability of the Arm, Shoulder, and Hand Questionnaire (DASH); and the Veterans Rand 12-Item Health Survey (VR-12) were used as outcome measures.

CASE DESCRIPTION

History

The patient, Mr. E, was a 33-year-old right-handed Caucasian male who was referred for physical therapy by his primary care physician (PCP) for evaluation and management of 'left upper arm pain' and 'left arm numbness.' Mr. E was employed as a graphic designer, had medical insurance, reported no significant past medical history, lived alone, was independent with all activities of daily living, and denied alcohol and

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tobacco use. Mr. E had been prescribed ibuprofen for pain relief 4 months prior to initial physical therapy examination, but did not have significant relief of symptoms. He reported noticing his left arm pain 14 months prior, but could not recall a specific mechanism of injury. Using an 11-point numeric rating scale (NRS) for pain, Mr. E rated his worst pain as 5/10, his current pain as 5/10, and his best pain 2/10. Numeric rating scale has a mean kappa weight for intra-observer agreement of 0.59 and correlation coefficient of 0.74.[7] Pain was located in his left mid-humerus, left elbow down into his mid forearm anteriorly, left triceps muscle, and left pectoralis muscle. Mr. E described the pain as deep, dull, aching, and constant. The pain increased as the day progressed, when he was driving his car, and when performing overhead activities. He worked in front of a computer during much of his day. Mr. E's pain was less in the morning and diminished when he was resting. Mr. E reported no prior physical therapy for this diagnosis.

Thirteen months before the initial physical therapy examination, Mr. E was referred to a neurologist who ordered an MRI, which revealed early spondylosis with foraminal narrowing at C2-3 and C6-7, which was more pronounced on the left side. The NCV and EMG studies were also conducted, which revealed mild median neuropathy at the wrist bilaterally and mild ulnar neuropathy at the elbow bilaterally. Mr. E was then referred to a board-certified orthopaedic surgeon for further evaluation and was treated with left carpal tunnel injection, which did not result in significant relief in symptoms. Nine months after initially meeting his neurologist, the neurologist suggested referrals to additional specialists, as a neurological cause could not be identified. The neurologist suggested that Mr. E's symptoms could be musculoskeletal in nature. Mr. E's PCP then referred him for physical therapy. Mr. E's goals for physical therapy were to decrease or eliminate his left arm pain and decrease discomfort when driving in his car.

Examination

Mr. E demonstrated a forward head and rounded shoulders posture in standing and sitting based on gross observation by the primary author and supervising physical therapist. Observation of Mr. E in standing demonstrated anterior displacement of his external auditory meatus in relation to his acromion process bilaterally and protracted shoulders bilaterally. In supine, Mr. E demonstrated left scalene muscle tightness compared to the right when his cervical spine was extended and rotated to the left and right. He also demonstrated pectoralis minor muscle tightness bilaterally.

Objective findings for shoulder active range of motion, shoulder strength, grip strength, and special tests are summarized in Table 1. Mr. E's shoulder range of motion (ROM) was without observable deficits. Intra-rater reliability of goniometric ROM of the shoulder has been reported as high with intra-class correlation coefficients (ICC) ranging from 0.94-0.99.[8] Measurement of strength was assessed using a numerical grading system ranging from 0 to 5.[9] Mr. E demonstrated normal strength throughout his shoulder. Inter-rater reliability for assessment of individual muscle strength of the upper limb demonstrated a median kappa of 0.54.[10] Manual muscle testing (MMT) is only moderately reliable, but is believed to be important in establishing a complete depiction of the patient because any demonstration of muscular weakness can support the notion of neurological involvement. Mr. E's grip strength was above normal, with average grip strength for a right-handed male at 46 kg using a Jamar Dynamometer at setting 3. Average grip strength for a right-handed male's left hand averaged 41 kg.[12] Reliability of grip strength has been previously studied and ICCs ranging from 0.90 to 0.97 have been reported.[11]

Several provocative maneuvers were performed on Mr. E to elicit his original symptoms as indicated in Table 1. The Quadrant, Spurling, and Distraction tests were used to determine cervical nerve root involvement. The Adson, Allen, and Roo tests were specific tests used to determine TOS by compression of vascular structures within the thoracic inlet. Standardized provocative tests, such as the Adson Test and Roo Test, are not entirely convincing of establishing a diagnosis of TOS due to poor predictive value (mean sensitivity = 72% and mean specificity = 53%).[13] Using a combination of maneuvers, however, increases accuracy. For instance, Gillard et al[13] evaluated 48 patients suspected with possible TOS using provocative tests and diagnostic tests, such as Doppler ultrasound, electromyograms, and plain radiographs to help establish a final diagnosis. Of the 48 patients suspected with possible TOS, 36 patients maintained this diagnosis after all testing was complete. Gillard et al[13] determined that a combination of positive provocative tests increased specificity. A positive finding in both the Adson and Roo test increased specificity to 82%.[13] The primary author concluded that Mr. E's condition was not likely due to compression of the subclavian vessels or cervical nerve roots since the majority of findings were negative.

In sitting, vertebra C7 demonstrated hypomobility of 2/6 during left cervical

Table 1. Initial Examination Findings

	AROM		Strength	
	Left	Right	Left	Right
Shoulder Flexion	180	WNL*	5	WNL
Abduction	180	WNL	5	WNL
External Rotation	90	WNL	5	WNL
Internal Rotation	80	WNL	5	WNL
Grip Strength (kg)**	54.4	57.2		
	54.4	54.4		
	54.0	56.2		
Special Tests				
Quadrant Test	Negative	Negative		
Spurling Test	Negative	Negative		
Distraction Test	Negative	Negative		
Adson Test	Positive	Positive		
Allen Test	Negative	Negative		
Roo Test	Negative	Negative		

*WNL=within normal limits, no limitations were observed

**grip strength was assessed using a hand held dynamometer at setting #3

rotation. Mobility was assessed using a 0 to 6 joint excursion grading scale.[14] Studies validating the use of a mobility scale to assess the cervical spine are limited in the literature. An investigation by Humphreys[15] determined the validity of cervical spine motion palpation. Twenty-four chiropractic students were asked to identify the most hypomobile cervical segments in 3 subjects. The students were blinded to the presence of congenital block vertebrae. Kappa coefficients for inter-rater agreement were substantial (K= 0.68). Sensitivity was 98% and specificity was 74%.[15] In supine, Mr. E's left first rib was significantly elevated superiorly compared to his right first rib as determined by the primary author and the primary physical therapist. Inferior mobility of the left first rib was 2/6. Studies validating the assessment of the first rib in conjunction with TOS are not reported in the literature. Neural tension tests for the radial and ulnar nerves were negative, but Mr. E reported a mild increase in intensity of symptoms during the median nerve tension test. Deep tendon reflexes of the biceps, triceps, and brachioradialis were normal. Mr. E reported intact bilateral upper extremity sensation in response to gross touch.

The DASH and the VR-12 were given to Mr. E after his fifth physical therapy session. Unfortunately, these two outcome surveys were not completed during the initial evaluation and the missing data are a limitation to this case report. As an alternative, the DASH and VR-12 surveys were completed by Mr. E retrospectively to represent his functional limitations during the initial physical therapy evaluation. These surveys were also completed during the sixth and ninth sessions. The DASH is a 30-item, self-report questionnaire designed to measure physical function and symptoms in patients with upper arm disorders. An optional module, DASH-Work, was included in the DASH questionnaire and was completed by Mr. E. The DASH-Work was included because Mr. E stated that his symptoms interfered with work-related activities. Test-retest reliability of the DASH had an ICC of 0.92. The DASH also had a strong correlation with the 12-Item Short-Form Health Survey (SF-12) physical health scores (r=0.74).[16] VR-12 is a 12-item, self-report generic health survey designed to measure burden of disease. The VR-12 asks the same questions that are found in the SF-12. Instead of the 'yes' and 'no' response found on questions 3 and 4 on the SF-12, the VR-12 divides the 'yes' categories into 4 separate categories: yes, a little of the time; yes, some of the time; yes, most of the time; yes, all of the time. Validity and reliability of the VR-12 are not widely reported in the literature. However, test-retest correlation for the physical component of the SF-12 for a population in the United States was 0.89 and the effect size estimates for responsiveness were 0.87 and 1.30.[17]

EVALUATION

Diagnosis

Mr. E demonstrated: hypomobility of the left first rib and C7, increased superior elevation of the left first rib, decreased muscle length of left scalene muscle compared to the right and bilateral pectoralis minor muscles, postural dysfunction, and pain in the left upper limb. According to the *Guide to Physical Therapist Practice*[18] preferred practice patterns, Mr. E's treatment diagnosis included impaired posture and impaired peripheral nerve integrity and muscle performance associated with peripheral nerve injury. While the subject of this case report had no specific medical diagnosis, his signs and symptoms were similar to TOS. The symptoms included: pain in the upper extremity, insidious onset of problem, and identification of anatomic abnormalities that could compress the neurovascular bundle. The forward head and rounded shoulders posture in conjunction with multiple anatomic anomalies may have resulted in increased mechanical compression of the left neurovascular bundle. Mr. E spends much of his time working in front of a computer. Thus, activity can exacerbate an already forward head and rounded shoulders posture that requires bilateral shoulder flexion, which can increase compression within the thoracic inlet.[3] Also, Mr. E complained of pain during overhead activities such as putting on a shirt. Pain symptoms corresponded to median and radial nerve innervations, but normal findings for Mr. E were documented for range of motion and strength and sensation, possibly suggesting that nerve damage was not extensive as indicated by previous diagnostic studies. The results of the provocative tests do not clearly indicate a specific lesion that leads to the possibility of nonspecific TOS.[2,3]

Prognosis

Prognosis of TOS was described as good, especially if symptoms are not severe enough to warrant surgery. This was consistent with our findings for this patient. Recurrence of symptoms is common, especially if the patient returns to prior activity without modification.[3] Etiology for Mr. E was unclear, but a treatment plan was developed after impairments were determined during the initial physical therapy examination. Offering conservative treatment and behavior modification is common before recommending surgical intervention.[2] Lindgren[4] evaluated a conservative treatment program consisting of shoulder exercises in patients with TOS. Eighty-eight percent of the patients were satisfied with the outcome of their therapy at discharge.[4] Short-term goals to be completed by Mr. E within 2 weeks post initial evaluation include: complete independence with prescribed home exercise program, restored joint mobility to C7 during left cervical rotation and left first rib to 3/6, decreased left scalene muscle tightness as compared to initial evaluation, and decrease pain at worst to 4/10. Long-term goals to be completed within 4 weeks included: patient demonstration of increased postural awareness, left scalene muscle length equal to right, and decrease pain at worst to 3/10. Mr. E would be seen 2 to 3 times a week for 4 weeks. The *Guide to Physical Therapist Practice*'s[18] expected range of number of visits per episode of care to be between 6 and 56 within a 3 to 8 month time period. Mr. E demonstrated good rehabilitation potential based on age, temperament, and agreement to the treatment plan.

Intervention

A home exercise program (HEP) was created for Mr. E after the initial evaluation. The exercises are indicated in Table 2 during session 1. Each exercise was demonstrated to Mr. E by the primary author (Appendix A). Mr. E felt comfortable performing each of the home exercises. He was instructed to perform each exercise 2 to 3 times a day for 4 sets of 30 seconds each. The HEP was designed to restore normal cervical and pectoralis muscle length. Compression of the neurovascular bundle can occur due to tight anterior scalene and pectoralis minor musculature.[2] Scalenus medius and anterior both insert on the first rib. Tightness in this musculature may possibly result in the first rib elevation. The importance of a neutral head and shoulder posture was also explained to Mr. E and that abnormal posture promotes compression and traction of the neurovascular bundle. Each physical therapy session began with a warm-up on

Table 2. Exercise Prescription and Parameters

Session	1	2	3	4	5	6	7	8	9
Upper Body Ergometer		4 min 90 rpm	4 min 90 rpm	4 min 90 rpm	4 min 90 rpm	4 min 90 rpm	4 min 90 rpm	4 min 90 rpm	4 min 90 rpm
Left Upper Trapezius mm. Self Stretch	HEP	4x30"	4x30"	4x30"	4x30"	4x30"	4x30"	4x30"	4x30"
Left Scalene mm. Self Stretch	HEP	4x30"	4x30"	4x30"	4x30"	4x30"	4x30"	4x30"	4x30"
Bilateral Pectoralis mm. Self Stretch	HEP	4x30"	4x30"	4x30"	4x30"	4x30"	4x30"	4x30"	4x30"
Horizontal Row Machine		1 Plate 3x10	1 Plate 3x10	2 Plates 3x10	2 Plates 3x10	2 Plates 3x10	3 Plates 3x10	3 Plates 3x10	3 Plates 3x10
Bilateral Pull Downs		Gray 3x10	Gray 3x10	Green 3x10	Gray 3x10	Gray 3x10	Gray 3x10	Gray 3x10	Gray 3x10
Chin Tucks	HEP	10x10"	10x10"	10x10"	10x10"	10x10"	10x10"	10x10"	
Manual Left Median Nerve Glides				3x10	3x10	3x10	3x10	3x10	3x10
Manual Left Median Nerve Stretch				5x30"	5x30"	5x30"	5x30"	5x30"	5x30"
Manual Left Scalene mm. Stretch		5x30"	5x30"	5x30"	5x30"	5x30"	5x30"	5x30"	
Left First Rib Inferior Mobility Glides**		Glide III-IV 5x30"	Glide III-IV 5x30"	Glide III-IV 5x30"	Glide III-IV 5x30"	Glide III-IV 5x30"	Glide III-IV 5x30"	Glide III-IV 5x30"	
Left Cervical Rotation with C7 Mobilization with Movement		3"x10	3"x10	3"x10	3"x10	3"x10	5"x10	5"x10	

*weight of 1 plate on Horizontal Row Machine is unknown, determination of number of plates used was based on patient tolerance
**treatment oscillation grades

the upper body ergometer (UBE). During session 2, strengthening exercises using isotonic machines and elastic bands were added to promote neutral head and shoulders posture. Manual therapy was also added to increase stretch of left anterior scalene muscle and normalize motion and position of the left first rib and normalize motion of C7 during left cervical rotation. The neurovascular bundle travels over the first rib through the costoclavicular triangle. An elevated rib can decrease this space. Mobilizing cervical segmental motion restrictions may promote tissue repair and has been shown to decrease neurogenic cervicobrachial pain and distribution.[20] Progression of exercises was made when Mr. E reported minimal soreness from the previous physical therapy session.

Manual therapy techniques applied to Mr. E are listed in Table 2. Nerve gliding techniques were applied to the median nerve before putting the nerve on continuous stretch while Mr. E was supine. Nerve gliding was applied at the left shoulder, elbow, and wrist (Appendix B). Upper limb tension techniques were used to put stress on the neurological structures. The median nerve was initially put on 'slack' by laterally flexing the head to the left and abducting the shoulder or flexing the elbow or wrist. The nerve was then 'glided' through the left shoulder, elbow, or wrist by increasing tension to the median nerve by extending the targeted joint. In this case report, nerve glides were implemented to reduce the possibility of nerve entrapment within the course of the median nerve.[19] In supine, pillows were placed under Mr. E's shoulder and back to allow cervical neck extension and rotation during manual left scalene stretch. The left first rib was depressed inferiorly using the left first metacarpal head of the primary author while using treatment oscillation grades III-IV while Mr. E was supine.[14] These techniques were performed to increase the spaces formed by the interscalene triangle and the costoclavicular triangle.[2] In sitting, left cervical mobilization with movement of C7 was applied while Mr. E rotated his head to the left (Appendix C). This movement-based intervention targeted the anatomic structures surrounding the nerve in the cervical spine to reduce adhesions and C7 motion restriction.[20]

During session 5, Mr. E indicated that his left elbow pain remained elevated since initially reporting increased posterior elbow pain intensity during session 4. Mr. E reported that his elbow pain was greater in the mornings. He attributed the pain to sleeping on his right side with both hands under his face with elbows in full flexion.

The primary physical therapist decided to use a taping technique to prevent extreme left elbow flexion with cover-all tape to the posterior left elbow to be implemented before Mr. E slept at night. During session 6, Mr. E reported relief to his posterior elbow. Mr. E was advised to continue the use of taping his left elbow. The primary physical therapist decided to make a permanent brace to prevent elbow flexion out of orthoplast splinting material. The brace was fabricated and given to Mr. E during session 8. During session 9, Mr. E reported that the elbow brace worked well, but needed more padding. Additional Moleskin was placed within the brace to increase comfort.

OUTCOME

Mr. E's clinical status was measured using the numeric rating scale (NRS) for pain intensity, observation of first rib mobility, the DASH questionnaire, and the VR-12 questionnaire over the course of 4 weeks. Mr. E was examined at the initial session, session 6, and session 9. Mr. E completed outcome measures retrospectively for the initial session and prospectively for sessions 6 and 9. Scores for the NRS are summarized in Figure 1. Farrar[21] reported that 2 points of reduction in reported pain indicated a clinically important difference. Mr. E demonstrated clinical improvement in pain between his initial and final physical therapy assessment and met the long-term goal of decreasing pain at worst to 3/10 at discharge. Mr. E reported a decrease in symptoms, indicating by session 6 that pain was only noticed in his elbow and were mild when driving. Overhead activities, such as reaching overhead, became less difficult to perform.

The primary author and the primary physical therapist determined that Mr. E's left first rib was elevated compared to the right, which may have caused compression of the left neurovascular bundle.[2] Mr. E did not complain of increased symptoms during first rib mobilization performed by the primary author. Validity and effectiveness of evaluating first rib mobility is absent in the literature, so it is not possible to determine if the observed 'changes' in joint mobility were clinically meaningful or not. Mr. E demonstrated normal left first rib motion, 3/6, when compared to the mobility of the right first rib after 9 sessions. The position of the left first rib demonstrated no significant elevation and was equal in elevation as compared to the right side (Figure 2). Mr. E also demonstrated restored joint mobility at C7 during left cervical rotation to 3/6 and left scalene muscle length equal to the right. Standardized measurements of the cervical spine using a goniometer were not taken. Instead, the primary author and the supervising physical therapist subjectively determined mobility of the cervical spine. This is another limitation to this case report.

The DASH can detect changes in improvement or worsening in health status.[16] Mr. E initially demonstrated relatively low disability as indicated by his DASH scores (Figure 3). The DASH was scored on a scale of 0 (no disability) to 100 (highest disability). Over the course treatment, Mr. E's DASH scores continued to decrease to relatively no disability. The minimal detectable change for the DASH is 11.32.[16] Mr. E did not show a change that was likely to be meaningful in his DASH score, but his DASH Work Module score was likely to be meaningful. The VR-12 was scored on a scale of 0 to 100, with higher scores indicating a more favorable health state. The minimal detectable change for the SF-12 is 6.63.[17] Since there were no studies available on the validity and reliability of the VR-12, results from Ware's SF-12 study was used.[17] Mr. E showed a change in his SF-12 score that was likely to be meaningful.

Mr. E demonstrated independence with HEP by verbally acknowledging to the primary author that he understood how to perform all the recommended exercises and performed them on a daily basis. Mr. E physically demonstrated increased postural awareness by maintaining proper alignment without verbal cueing from the primary author throughout the final treatment session.

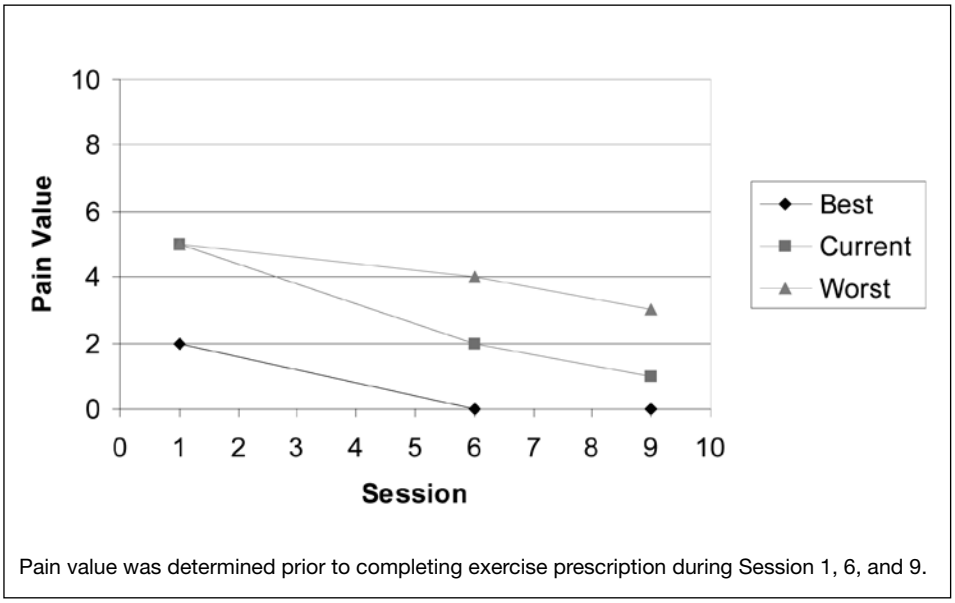

Figure 1. Numeric rating scale pain outcome measure.

DISCUSSION

Mr. E's self reported history of multiple referrals to various professionals eventually led to evaluation by a physical therapist to determine the cause and to treat the source of his upper arm pain. Mr. E had minimal success with past treatment efforts. He demonstrated a postural syndrome, which can potentially lead to functional compression of the neurovascular bundle. Mr. E's physical examination showed no deficits in strength or shoulder range of motion and diagnostic tests were normal. This compilation of information is consistent with nonspecific TOS and conservative treatment is recommended.[2] There is limited research and few objective clinical procedures to confirm a TOS diagnosis.[13] Provocative tests can be used to reproduce symptoms, but these maneuvers can also be positive in a typical population.[22] Poole and Thomae[6] evaluated 50 patients with complaints of pain in their shoulder, upper extremity, and neck, in which 27 already had operations to treat various upper extremity diagnoses and did not have benefit. After evaluation and diagnostic testing by the investigators, only 12 were thought to have TOS. Poole and Thomae[6] emphasized the importance of a thorough history and physical examination as well as working in a multidisciplinary team.

It is the belief of the primary author that the combination of exercises and mobili-

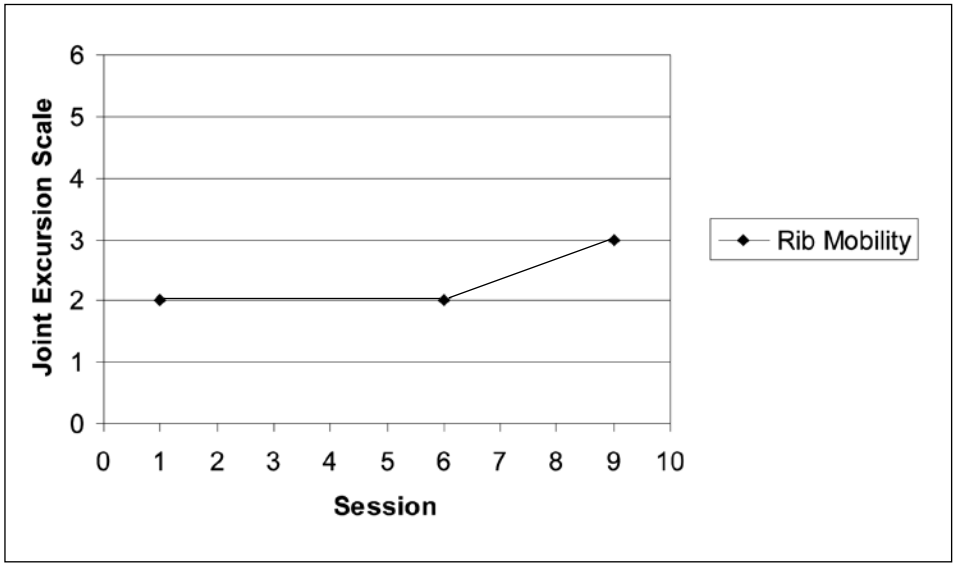

Figure 2. Left first rib mobility assessment.

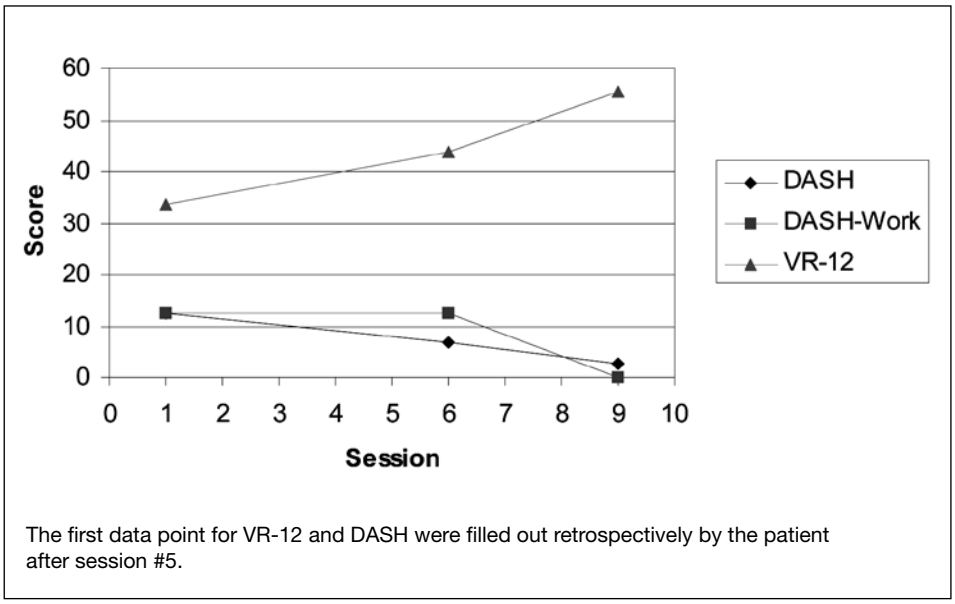

Figure 3. Outcome measures of the DASH, DASH work module, and VR-12.

zation techniques used on Mr. E increased anatomical spaces and decreased adhesions within his thoracic inlet. As a result, Mr. E experienced decreased compression of his neurovascular bundle and decreased pain intensity. The progression of exercises and the normalization of rib and cervical joint movement appeared to have coincided with decreased complaints of pain and improved left upper extremity function by Mr. E. Whether the combination of treatment techniques, a single technique, the timing of techniques used, or natural history of TOS was responsible for Mr. E's improvement can not be determined by this case report. Lindgren's descriptive study of patients with possible TOS reported the satisfaction of patients who completed a conservative approach to relieve their symptoms of arm pain.[4] The intervention included shoulder exercises to restore movement of the shoulder girdle and to increase anatomic spaces for neurovascular structures. Motion of upper cervical spine segments was restored if it was found to be restricted. The scalene muscles were strengthened and stretched to correct the perceived malfunction of the first rib. Lindgren[4] noted that some authors in the literature emphasized correcting posture and strengthening the shoulder girdle for patients with TOS. Mobilization of the first rib has been described as 'essential' in TOS therapy, but mobilization may also provoke symptoms.[4] Supporting the cervical mobilization approach described in this case report is a study by Coppieters et al[20] who treated 10 randomly assigned patients with a cervical lateral glide treatment technique and 10 randomly assigned patients with ultrasound over the painful region. All patients had a cervical segmental motion restriction. The mobilization group demonstrated a significant decrease in pain distribution and intensity while the ultrasound group did not.

Mr. E demonstrated clinical improvement in pain and improved view of his general health by session 9. Meaningful change was not noted in physical function of the upper limb, according to the DASH, but the DASH work module indicated meaningful change. The DASH may not be sensitive enough for those individuals requiring prolonged use of the upper arm, such as during computer work or driving long distances. Only 3 out of 21 activity items in the DASH involved overhead activity and could not account for the activities Mr. E was performing during a typical day. The optional work module in the DASH described difficulty of physical ability to do work, which Mr. E participated in on a daily basis. Mr. E complained of increased symptoms during activities that could decrease anatomic space in his thoracic inlet. Development of an instrument designed to measure physical function and symptoms of patients performing activities that would result in functional compression of the brachial plexus trunks and subclavian vessels should be considered.

There is a need to develop objective criteria to diagnose TOS and to identify optimal treatment. A cross-sectional study should be used to identify risk factors associated with TOS by comparing a sample of patients diagnosed with TOS to their healthy counterparts. Clearly identifying these risk factors can make recognizing TOS less challenging. This case report identified rib mobilization as one of many treatment techniques for TOS. Future research should also be directed towards randomized clinical trials to determine the effects of first rib mobilization on subjects diagnosed with neurogenic or nonspecific TOS against a healthy population identified with a nonsymptomatic elevated first rib. The NRS for pain intensity and radiographs and MRIs should be used as outcome measures to determine change in anatomic spaces within the thoracic outlet pre and posttreatment.

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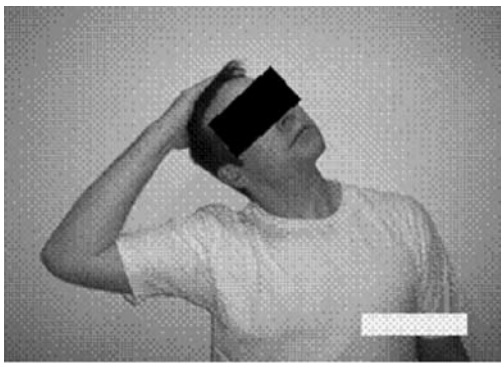
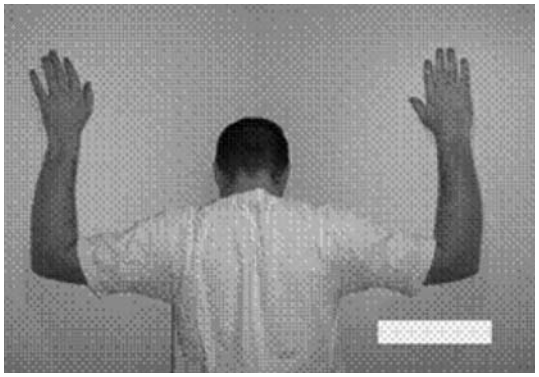
Appendix A. Home Exercise Program

A. Left Upper Trapezius Stretch, sitting



B. Left Scalene Stretch, supine



C. Bilateral Pectoralis Stretch (Corner Stretch), standing

D. Chin Tuck, sitting start position

E. Chin Tuck, sitting end position

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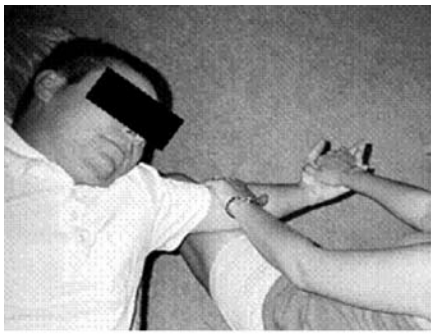
Appendix B. Manual Therapy Techniques

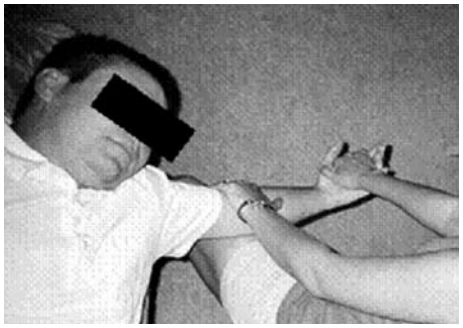


A. Left Median Nerve Glide, supine start position at shoulder

B. Left Median Nerve Glide, supine end position at shoulder

C. Left Median Nerve Glide, supine start position at elbow

D. Left Median Nerve Glide, supine end position at elbow



E. Left Median Nerve Glide, supine start position at wrist

F. Left Median Nerve Glide, supine end position at wrist

* Not shown in Appendix E a-f is constant shoulder depression (which is usually held in place by the evaluator) to prevent obstructing the model's left arm

Appendix C. Mobilization Techniques

A. Left First Rib Mobilization, supine

B. C7 Mobilization, sitting start position

C. C7 Mobilization, sitting end position

* The model in Appendix D-F is a healthy male volunteer with no significant past medical history. The model agreed to and signed a consent form to be photographed for the purpose of education in physical therapy.

Melorheostosis: A Rare Case Report

Dr. V.G. Murakibhavi; Professor[1]
Dr. Shilpa V. Prasan[1]
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Dr. Shonali[1]
Dr. Md Imran[1]

Melorheostosis is a rare bony dysplasia principally affecting the long bones and adjacent soft tissues. The condition is characterised by hyperostosis of the cortex and the treatment is symptomatic. The condition becomes apparent during childhood or adolescence and is known for slow, constant progression into adulthood. We hereby report a case of melorheostosis.

A 14-year-old boy presented to the orthopaedic department, with chief complaints of swelling of the left foot and ankle since he was 11 years of age (3 years). The swelling 3 years ago was insidious in onset after twisting his foot while at play. An increase in severity of symptoms was noted after being sedentary and subsided after walking or playing. The swelling was intermittent and associated with an occasional dull achy pain in the left foot. The patient was able to weight bear without any complaints even after the initial injury. There was no limitation of daily activities. Plain film radiographs of the left foot 15 days after the trauma showed dense sclerotic changes of 4th, 5th metatarsals, proximal phalanges 4th, 5th toes, calcaneum. The patient was soon started on anti-tubercular treatment, isoniazid, rifampicin, ethionamide and pyrazinamide for 2 months; and isoniazid and rifampicin for 4 months by a local doctor, which he discontinued after 2 months as there was no improvement in the symptoms. Fifteen days prior to presenting to the outpatient department, the patient started developing pain in the foot while sitting cross legged, squatting few common postures in Indians. Also his parents noticed a change in his walking whereby he tended to walk on the medial border of his left foot**.** There was no history of fever, night cries, joint pains, or immediate contact with patients with Koch's disease. No history of loss of weight or appetite. The boy was completely immunized including BCG Vaccination for tuberculosis. Gait assessment revealed that he walked on the medial border of the left foot. No limb length discrepancy noted. ***Left foot*** showed pes planus, prominence of tarsal bones on the medial aspect, reduction in the height of the medial arch of the foot (Figure 1), decreased medial and lateral borders compared to right foot (Figures 2, 3).

Investigations were done to rule out tuberculosis, osteomyelitis, and osteosarcoma as per the patient presentation. All the blood investigations were within normal limits. Follow-up plain film radiographs were taken and showed a progression of the sclerotic changes to the 4th and 5th distal phalanges, 3rd metatarsal, lateral cuneiform, and cuboid (Figure 4A & B). Analysis of the radiographs showed fibular involvement (Figure 5) on the left limb. The remaining bony structures were reported as normal. Chest x-ray was normal. Enzyne-linked immunosorbent assay (ELISA) and polymerase chain reaction (PCR) for tuberculosis was negative. Fine needle aspiration cytology (FNAC) and trephine biopsy of calcaneum showed a mixture of cortical and cancellous bone. (Figures 6, 7)

Parents were reassured and complete information about the condition was provided. Analgesia was provided (Tab Ibuprofen 400 mg Tid, Tab paracetamol 500 mg Qds) when required. The patient received physiotherapy--muscle strengthening exercises--for invertors and evertors of foot, TENS for 10 minutes daily for a period of 2 weeks. After the patient was discharged, he was also followed up in physiotherapy outpatients regularly. The patient was then followed up in the outpatient department after 6 months to assess the progression of the disease, which was uneventful. Annual follow up was advised.

Figure 1. Pes planus and prominent tarsal bones on left foot.

Figure 2. Decreased lateral border on involved foot.

Figure 3. Decreased medial border on involved foot.

Figure 4A. AP radiographic view left foot.

Figure 4B. Sclerotic changes in calcaneum lateral cuneiform, 3rd, 4th and 5th metatarsal, phalanges 4th and 5th toes.

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Figure 5. Left leg: AP showing candle wax dripping appearance in fibula.

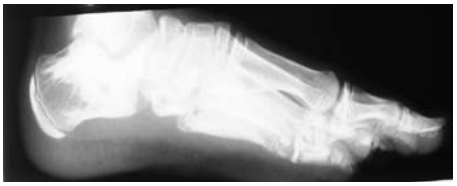

Figure 6. Marking for FNAC/Trephine biopsy.

Figure 7. Irregular mixture of lamellar and woven bone.

Melorheostosis **(Greek: MELOS: LIMB; RHEOS: FLOW; OSTEON: BONE)** is a rare, nonfamilial bony dysplasia characterized by irregular hyperostosis of cortex resembling melting wax dripping down the sides of the candle on radiography.

Léri & Joanny first described the condition in 1922 as **"**Hyperostose en coulee." The prevalence has been reported to be around 1 in a million population. The disorder begins in childhood or adolescence with a gradual slow progression to adulthood. The condition has equal gender predilection.

The site of defect is at the formation of both intramembranous (predominant) and enchondral bone formation. The distribution often suggests sclerotomal abnormality involving one or more sclerotomes or areas of bone innervated by spinal sensory nerves. Various theories have been proposed but no definite aetiology has been established**.** Recent studies claim that the condition is due to defect in LEMD3 gene also known as MAN1, which encodes for an integral protein on the inner nuclear membrane. The condition may be monomelic or polymelic with the lower limbs commonly being involved. The condition is often asymptomatic; however, a limitation of joint motion is present in the majority of the patients. Contractures result from periarticular calcification, soft tissue fibrosis, and bony deformity.

Frequent signs:	**Occasional signs:**
Restricted joint mobility	Capillary haemangioma
Skeletal anomalies	Thick skin
Amyotrophy/muscle agenesis	
Lower limb asymmetry/hemi hypertrophy	
Upper limb asymmetry	

The condition may be associated with numerous conditions like scleroderma, neurofibromatosis, tuberous sclerosis, rheumatoid arthritis, haemangioma, vascular anomalies including aneurysms or renal artery stenosis. Malignant transformation in isolated conditions has been noted.

The classical radiological findings include asymmetric, irregular osteosclerosis along the axes of long bones is seen. The sclerosis in the long bones may be endosteal or subperiosteal. The hyperostosis may be round or irregular. Soft tissue calcification or ossification may be seen. Scintigraphy shows abnormal increased tracer uptake in the bone and soft tissue lesions. Histologic examination reveals that new bone is either woven or lamellar. Tuberculosis, osteomyelitis, and osteosarcoma are a few of the conditions to be considered. We considered these pathological conditions and evaluated accordingly to rule them out as the cause of this patient's condition. The treatment regimen for this condition is based on treating the symptoms. Pharmacotherapy and physiotherapy is recommended to control bone pain.

Operative intervention is indicated to alleviate pain due to mechanical changes caused by asymmetric bone growth. Bony deformities producing can be corrected using techniques such as soft tissue contracture release, capsulotomies, osteotomies, and tendon resections/lengthening. The Ilizarov technique has been reported to correct deformities. Amputation is a possible intervention in very painful limbs with contractures and ischemia.

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bookreviews

Coordinated by Michael J. Wooden, PT, MS, OCS

Carrol K, Edelstein J. Prosthetics and Patient Management. A Comprehensive Clinical Approach. Thorofare, NJ: SLACK Inc; 2006. 266 pp.

The authors' goal with this text is to provide the clinician with the framework for structuring efficient and comprehensive care for this patient population. Comprehensive care includes surgery to a referral for prosthetic training to discharge. Physical therapists will benefit from having a plan and the tools to meet the multiple needs of this patient population. The text begins with the clinic team approach to rehabilitation. It describes the interdisciplinary organizations concerns with prosthetic rehabilitation. It also explores the roles of each member on the rehabilitation clinic team, including the physical therapist. The text begins, appropriately, with the amputation surgery. This chapter describes the preoperative clinical and instrumented evaluation procedures. It also outlines the osteomyoplastic procedures for transtibial, transfemoral, transmetatarsal, and transhumeral amputations. Goals were discussed for each postoperative surgery. Detailed elements of a postoperative assessment including history and physical/psychological assessments were discussed.

Within the postoperative discussion was pain management. Models of pain were discussed, including the biomedical and the biopsychosocial model. Phantom limb pain was discussed in detail since 60% to 85% of individuals report phantom limb pain after surgery. A variety of treatments were also discussed for acute and chronic pain, including physical therapy intervention. A very interesting chapter was skin disorders and management. This was an excellent chapter describing the healing process and relating it to prosthetic wear along with various skin disorders. This chapter differentiated the grades of ulcers and discussed the management of each grade. The text often mentions treating the patient holistically. There is one dedicated chapter to the psychological consequences of amputation. It highlights the common psychological consequences after an amputation and relates it to the age of the patient and the emotional adjustments. There is also recommended interventions to reduce negative response to the amputation.

The text focuses 8 chapters on rehabilitation of people who have amputations. It is divided into adults with lower limb amputations, and adults with upper limb amputations. These chapters are very specific in the type of rehabilitation with the prosthetic design. There is also a specific chapter giving special considerations to children. This chapter portrays the contributions pertinent to the care of children and each member of the rehabilitation team. It highlights the unique aspects of surgery and fitting timetable for children.

The final chapters review rehabilitation outcomes. They differentiate among different subjective instruments of function, including the Stanmore Herold Wood Mobility Index, Prosthetic Evaluation Questionnaire, Locomotors Capabilities Index, and the Amputee Mobility Predictor, as well as Quality of Life Skills. These tests are excellent for functional outcomes of a clinic along with outcomes per clinician. Also included in the appendix is a physical therapy index form for evaluation of a person that has had an amputation. And finally the text ends with adaptive prostheses for recreation. This chapter introduces the concepts of adaptive prosthesis for sports and other recreation events. It relates physical fitness to prosthetic youths and describes lower and upper extremity adaptive prosthesis. It also discusses and links activities of varying levels of intensity with specific prosthetic demands and options, and finally explores the prosthetic options available for participation in professional sports.

The text contained poor quality photos, graphs, and charts. However, this is an excellent reference text for those clinicians dealing with patients that have had an amputation. The text would be beneficial for all people on the rehabilitation team. The text is good for physical therapists and the rehabilitation programs for specific prosthesis and protocols. I would highly recommend this text to any student or practitioner who has to work with people that have amputations.

Daryl Lawson, PT, DPTSc

Kim DH, Cammisa FP, Fessler RG, eds. Dynamic Reconstruction of the Spine. New York, NY: Thieme; 2006. 402 pp, illus.

This textbook is a review of research, advances, and current technology in reconstruction of the spine. It also may stimulate interest in further research and potential future developments in the field. This text is organized in to 4 sections: Motion Preservation of the Spine, Restoration of Cervical Motion Segment, Restoration of Lumbar Motion Segment, and Future Biological Approaches to Disc Repair. The sections are authored by internationally known physicians that specialize in spine dysfunction.

In the first section, the initial chapter provides a historical review of Spinal Arthroplasty and Dynamic Stabilizations. Spinal Arthroplasty includes nucleus replacement and total disk replacement and these procedures replace part or an entire disk with an implant to mimic normal motion. Dynamic Stabilization includes interspinous process spacers, pedicle screw-based systems, and facet replacement. The second chapter reviews current concepts in spinal fusion versus nonfusion.

In the second section, chapter 3 reviews the design rationale for cervical arthroplasty and peer-reviewed biomechanics literature and conclusions. Biomechanical testing protocol for evaluating cervical disk arthroplasty is discussed in chapter 4 and chapter 5 reviews the rationale, indications, potential disadvantages, current designs of cervical total disk replacements, and pros/cons of the various designs related to clinical experience. The following chapters review the specific disks: Spinal Kinetics, Bryan device, Prestige family of disks, ProDisc-C, PCM (Porous Coated Motion), Cervidiscs, and CerviCore prosthesis. Each chapter reviewed design philosophy, materials testing, surgical techniques, clinical trials/evaluation, complications, outcomes, and/or conclusions of each cervical disk. All chapters include illustrations or photographs of disks, x-rays of implantation in the body, and data as needed to visualize the results.

The third section, Restoration of the Lumbar Motion Segment, contain 5 parts: Lumbar Nucleus Replacement, Lumbar Total Disk Replacement, Dynamic Posterior

Stabilization, Facet Replacement, and Annular Repair. Initially, the pathophysiology of the degenerating disk is reviewed, followed by the biomechanical considerations for partial disk replacements. The Raymedica Prosthetic Disk Nucleus (PDN), the DASCOR system, NeuDisc, NUBAC Artificial Nucleus, SINUX (Sinitec), and NuCore Injectable Disk Nucleus were the different options discussed for replacement, reviewing methodology, indications, complications, clinical studies, and/or results and conclusions. Again, diagrams, illustrations, and radiographs were included to assist in understanding the material.

In Total Disk Replacement, biomechanical considerations, indications, complications, and the various options were reviewed. The types of artificial disks discussed separately were Charite, ProDisc, Maverick, Mobidisc, Activ-L Lumbar (Aesculap), and FlexiCore. In Dynamic Posterior Stabilization, the rationale was reviewed and the following individual systems: SoftFlex, X STOP Interspinous Process Decompression System, Wallis Interspinous Implant, Coflex, DIAM (Device for Intervertebral Assisted Motion), Tension Band System, Shape Memory Implant (KIMPF-DI Fixing) system, Dynesys, Graf Ligamentoplasty, Isobar TTL, Dynamic Stabilization System, Cosmic screws, and BioFlex Spring Rod Pedicle Screw system. All of these chapters discuss the particular device, indications, contraindications, clinical results, and conclusions of each. Illustrations and detailed summaries of all options are explored.

Facet replacement technologies are outlined generally and specific discussions of the TOPS (Total Posterior Facet Replacement and Dynamic Motion Segment Stabilization System) and Total Facet Arthroplasty System (TFAS) are made. Lastly, indications and techniques in Annuloplasty are discussed with treatment following microdiskectomy, after placement of intervertebral prostheses, and with symptomatic annular tears. The text is completed with a chapter on Molecular Therapy of the Intervertebral Disk.

This text is a useful resource for the physical therapist that specializes in treatment of the spine. There is a wealth of clinical information on the various techniques of spinal surgery, some common procedures as well as uncommon. The book contains no information regarding postoperative recovery, rehabilitative stages, or protocols. This is a textbook that provides information on surgical techniques only and is a good resource to understand the specific surgical techniques used in our clients.

Sylvia Mehl, PT, OCS

Cassar-Pullicino VN, Imhof H. Spinal Trauma – An Imaging Approach. New York, NY: Thieme; 2006. 240 pp, illus.

The editors of this text are a radiologist from the United Kingdom and a professor of radiology and nuclear medicine from Austria. There are 26 international contributors to this text including radiologists, orthopedists, and academicians. The imaging of spinal trauma has been revolutionized with the advent of CT and MRI. This book serves a great need for compilation and integration of advances in imaging in a single text. The anatomic, pathophysiologic, clinical considerations, and surgery of spinal injuries are covered in this text. The emphasis is on the roles of CT and MRI in detection and evaluation of spinal injury. The editors have presented a broad spectrum of spinal topics to enhance the accurate understanding of underlying pathology to form the basis of therapeutic decisions. The text is profusely illustrated with pictures of radiographs, CT scans, and MRIs and superb drawings by a renowned medical illustrator. The state of the art imaging of the spine is presented to improve the knowledge and increase the confidence and diagnostic skills of health care professionals who work with patients who have had spinal trauma.

There are 17 chapters in this text. Chapter one considers the clinical perspectives of spinal imaging. Following a brief review of the effects of spinal cord injury (SCI), the clinical and radiologic assessment of spinal cord injury is presented for acute, subacute, and long-term effects. The authors of this chapter discuss missed spinal injuries in the acute stage, diagnosis of SCI in conscious and semiconscious patients, and warn that the "absence of fracture does not exclude a serious ligament injury of the spine nor serious cord damage." Assessment of the cardiovascular and respiratory system, abdomen, bladder and urinary system, level of consciousness, cognitive function, and electrophysiological assessment of SCI is included in this chapter. Also included are standards for neurologic examination and documentation such as Frankel's Classification System, and management principles of spinal injuries, including the controversial role of surgery.

Chapter 2 looks at the biomechanics and pathophysiology of cervical spine trauma. The major aim of this chapter is to show the spectrum of craniocervical injuries from a functional perspective. The authors emphasize that all traumatic cervical spine injuries are a combination of compression and traction forces on the spine. The chapter contains several color photos of cadaver cross-sections of cervical spine traumatic injuries. The title of chapter 3 is 'Optimizing the Imaging Options.' I found this chapter particularly interesting and applicable to physical therapy. The authors state that the guiding principle of any assessment of the spine is to "diagnose or exclude *significant* spinal injury... in a cost effective manner... keeping radiation dose to the patient as low as possible." Tables list the Canadian cervical spine rule for safe assessment of range of motion, and a comparison of spinal injury vs. suitability of imaging modality. Numerous radiographs, CTs, and MRIs of patient cases are included throughout the chapter. Chapter 4 considers the rationale and relevance of classification of spinal injuries. The author of this chapter discusses the controversy about classification of orthopaedic injuries and explains several classification systems that have been used for spinal injuries. The dominant classification system used today, the 3-column concept of Denis, is illustrated in color. The signs and significance of malalignment of the cervical spine are covered in chapter 5. The author of this chapter first reviews normal cervical spine alignment, and then introduces 17 cases of malalignment with accompanying radiographs for each case and the significance of the radiologic findings. Chapter 6 focuses on several areas concerning the detection and implications of vertebral injuries: (1) indicators of high risk for injury, (2) mechanisms of injury and its imaging 'finger prints,' (3) the ABCs of injury, (4) the determination of stability following injury, and (5) the significance of the injuries. This chapter is generously supplemented by radiographs, CT images, and MRIs. The tables of signs of cartilage joint space abnormalities and soft tissue abnormalities will be of interest to physical therapists. Imaging of neurovascular injury related to the spine is discussed in chapter 7. The use of MRI, magnetic resonance angiography (MRA), and CT angiography (CTA) are considered for imaging these injuries. Cases of patients with neurovascular injury are illustrated with images of MRI, MRA, and CTA. I found the section on vertebral artery injury particularly interesting because of clinical concerns about vertebral artery occlusion with manual therapy

interventions. Chapter 8 covers trauma to the pediatric spine. The chapter begins with reviews of the normal development of the vertebral column and normal variations of the column as seen on imaging studies, and then discusses pediatric spine injuries including AO dissociation, fractures, dislocations, physeal injuries, slipped vertebral apophysis, SCIWORA (spinal cord injury without radiographic abnormality), and spondylolysis.

Sports injuries of the spine are the topics for chapters 9.1 (spondylolysis) and 9.2 (diskovertebral overuse injuries). These chapters will be useful for any physical therapists that work with athletes. The rigid spine is considered in chapter 10, including findings on diagnostic imaging studies for ankylosing spondylitis, disseminated idiopathic skeletal hyperostosis, cervical spine injuries, and thoracolumbar spine injuries. Chapter 11 covers spinal trauma in the elderly. The author notes that an increasing physically active aged population has a higher chance of major trauma that involves the spine, and the elderly are more likely to sustain significant injury to the spine through minor trauma. The clinical features, imaging techniques, and radiological features of imaging studies for traumatic injuries to the cervical and thoracolumbar spine in the elderly are included in this chapter. The title of chapter 12 is 'Therapy - Options and Outcomes.' The author states the purpose of this chapter is to provide "an overview of spinal fractures and discuss therapy options." The chapter begins with an overview of the epidemiology, pathophysiology, and anatomical classification of spinal fractures, and the patterns of injury of these fractures supplemented with pictures of radiographs and MRIs. Next management principles of spinal fractures are discussed including emergency, pharmacological, neurosurgical, and orthopedic surgical management. The author addresses spinal orthotics for post-op management of spinal fractures and early ambulation of thoracolumbar fractures "under the supervision of physiotherapists." Chapter 13 looks at imaging in chronic SCI, and focuses on the role of radiology in routine surveillance of the CNS and renal tract and deterioration of other systems. Chapter 14 discusses the role of radiologists in the diagnosis of vertebral fractures and osteoporosis. This chapter is particularly relevant to the practice of physical therapy. The use of screening exams, diagnosis with lateral radiographs, bone densitometry, dual X-ray absorptiometry, and other diagnostic tests for osteoporosis and compression fractures are emphasized in this chapter. A discussion of percutaneous vertebroplasty is included. A list of "10 things to remember" about osteoporosis and case studies with radiographs are highlights of this chapter. Chapter 15 considers the most important clinical findings and radiologic features for the differentiation of benign vs. pathological vertebral collapse. Neuropathic osteoarthropathy (Charcot's) of the spine is the topic for chapter 16. Chapter 17 completes the text with a look to the future of trends and developments in spinal cord regeneration. A brief overview of current research including neuroprotection, regeneration, transplantation, and rehabilitation leaves one hopeful for the future of treatment of spinal cord injuries.

This textbook is a stimulating look at the current state of imaging of spinal trauma. The liberal inclusion of radiographs, CT images, MRIs, and illustrations brings life to the subject matter and the case studies. Physical therapists will find this text useful as a reference for their patients with spinal injuries. I recommend that physical therapy programs include this text in its libraries for both faculty and students.

Thomas P. Nolan Jr., PT, MS, OCS

Krauss JR, Evjenth O, Creighton D. Translatoric Spinal Manipulation for Physical Therapists. Minneapolis, Minn: OPTP; 2006. 134 pp, illus with companion DVD.

This textbook is written to assist physical therapists and physical therapy students learn about translatoric spinal manipulation (TSM) in theory as well as application. Translatoric spinal manipulation is a series of both high and low velocity spinal manipulative techniques that one of the authors, Olaf Evjenth, along with Freddy Kaltenborn PT, OMT has developed over their careers. These small amplitude techniques have been designed to isolate the manipulation to a single spinal segment using either traction or gliding forces. There are 3 main types of TSM: disc traction, facet gliding, and facet distraction. While this book is exclusive to TSM in presentation, it acknowledges that the therapist will use multiple other techniques along with TSM. The authors caution that these techniques require supervision and constant practice to become proficient in them. The reader is referred to the 4 residency/fellowship programs located in the United States for information regarding further training.

The book is clearly written and is organized in a logical manner. The indications and contraindications of TSM are clearly explained. The positioning of the therapist and the patient is discussed. Handling of the patient with care and confidence is stressed. The reader is taken through an exercise where locking of the spine is performed. This is a very effective method that the authors have used to explain coupled and noncoupled movements.

Prior to presenting the TSM techniques, the relevant anatomy, kinematics, and special tests are offered for each of the spinal regions. The biomechanics of each of the TSMs are also presented with clear pictures.

Each of the techniques is clearly portrayed in color half page photos. There is an abundance of information in each page. In the upper corner, there is a display indicating if the technique is appropriate for the entry-level postprofessional therapist. In the same key, it shows the technique is appropriate as either a high and/or low velocity technique or if the technique should be avoided by the entry-level therapist. The indications for the technique are presented. Arrows that depict the direction of force are bright yellow outlined in orange and are also used to show different contact points on the spine using spinal models. The steps for the procedures are viewed in numbered boxes. This allows the reader to follow the proper sequence. The authors present trouble-shooting tips along with clinical notes for each technique.

The DVD is of high quality as well. It is meant to be used in conjunction with the book. Each of the techniques in the DVD references the page number in the book so that the therapist can use both resources simultaneously. The DVD can be paused to examine hand contacts, patient, and/or therapist position. The verbal description of the techniques coincides with the steps noted in the book.

This book is well written. It has excellent, clear, and large photos. The photos along with the DVD make for an excellent learning tool for physical therapists. The true value of this text is in the notes section. This allows the therapist to learn clinical pearls from the authors regarding the techniques. I would highly recommend this book for any therapist using manual therapy techniques with the understanding that this is not a 'how to' book. This book is meant to reinforce material already learned or augment continuing education.

Jeff Yaver, PT

inthespotlight

Lynn Snyder-Mackler, PT, ATC, SCS, ScD
Coordinated by Christopher Hughes, PT, PhD, OCS

CH: Dr Snyder-Mackler, can you provide the readers with a brief overview of the research you are currently engaged in?

LSM: My laboratory runs the gamut of knee rehabilitation from acute knee injury through total knee arthroplasty. Early in my career I began my love affair with three things that have driven my research career and clinical practice: neuromuscular electrical stimulation, ACL injury, and the quadriceps. My patients who had had knee surgery inevitably had quadriceps impairments. Immediately after surgery, they 'forgot' how to do a SLR. Why did that happen??? Why is it still happening?? I wasn't just interested in strength, I really believed that quadriceps muscle was magic and was the key to good function after knee injury, and I still do. The quads looked terrible almost from the time of injury and it only got worse. This work began in Boston and has continued over the past 20 years, but it had its genesis in my clinical practice and its life is still breathed into it by my collaborators and graduate students, vibrant clinician/scientists who make sure that we don't ask irrelevant questions. Currently we have several active NIH grants that study knee rehabilitation, functional recovery from knee injury/disease, and surgery and mechanisms underlying compensations. The projects are Dynamic Stability of the ACL Deficient Knee, Correction of Varus Deformity by Wedge Osteotomy, Can Neuromuscular Training Alter Movement Patterns?, and NMES for Older Individuals After Total Knee Arthroplasty. All of them involve treating and testing the patients in the University of Delaware Physical Therapy Clinics and involve all of my doctoral and post-doctoral students, most of whom are physical therapists and our wonderful clinical staff.

CH: How would you like to see the results of your work applied by clinicians?

LSM: I would like to see the evidence we have produced being used in the clinic. While our work is readily cited and used by researchers, not many of the evidence-based practice guidelines that we have developed for the management of knee injury are used clinically outside of a few centers.

CH: You have been a successful mentor to many students over the years. What common traits have these past students possessed that you deem essential to achieve success in physical therapy?

LSM: For physical therapists who want to be researchers, I look for them to be driven by questions and to not be frustrated, but rather be fascinated when the quest for answers inevitably leads to more questions! HL Menken put it this way "…Consider, for example, two (motives): mere insatiable curiosity and the desire to do good. The latter is put high above the former, and yet it is the former that moves one of the most useful men the human race has yet produced: the scientific investigator. What actually urges him on is not some brummagem idea of service, but a boundless, almost pathological thirst to penetrate the unknown, to uncover the secret, to find out what has not been found out before." This holds for clinical students as well. Clinical practice is also an endless search for answers and the comfort that comes when you weigh the preponderance of evidence, render a clinical decision, and your patient improves.

CH: What advice can you give clinicians with regard to furthering their professional development?

LSM: My colleagues and I in PT research have committed ourselves to mentor the next generation of physical therapy researchers, as graduate students and as young faculty. Practically, this means recruiting talented physical therapists into doctoral programs, encouraging postdoctoral training in our students, and serving as a research mentor for young faculty who forsake postdoctoral training by fashioning part-time postdoctoral experiences within the work environment. I want to encourage those in whom the insatiable curiosity has been awakened to pursue formal research training, while staying in touch with the clinic and to remember that research is what makes physical therapy's future a reality.

CH: If there was one thing you would like to change in physical therapy education what would it be?

LSM: I would like to see all the students do a residency.

CH: In your opinion what has been one of the most influential factors that has had a positive impact on the profession?

LSM: The visionaries who insisted in the 1970s that the future of PT required post-baccalaureate entry. They were like the mythical Sisyphus, working against nearly every institution, but sometime in the 1990s they actually got the rock to the top of the hill and our profession has skyrocketed as a result.

Thank you Dr. Snyder-Mackler for taking the time to share your views with OP readers.

Nominations are Being Accepted for the Upcoming 2007 Elections

- Treasurer
- Director
- Nominating Committee

If you are interested in serving or know someone who is, please contact our Nominating Committee Chair, Kyndy Boyle at boylekyn@elon.edu

csmboston

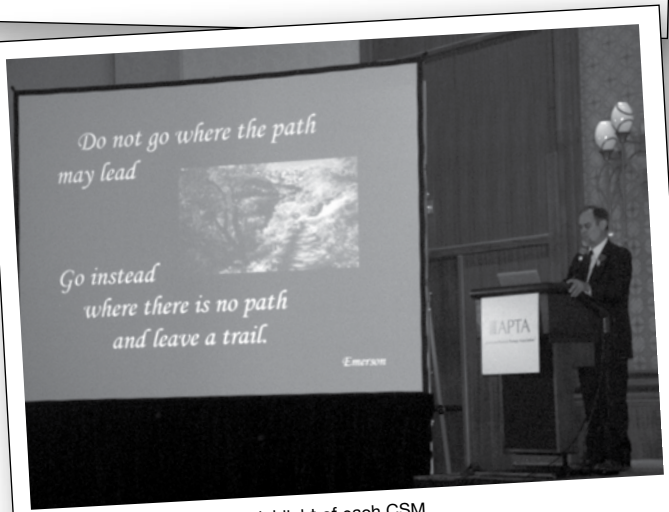
If you missed CSM in Boston, you missed a ton!

Catching up with colleagues and friends is what CSM is all about.

A reception for our outgoing President, Mike Cibulka. Thank you for your years of service to the Section.

The Board and Committee Chairs Meeting brings all together to conduct Section business.

Orthopaedic Section Business Meeting.



The Awards ceremony is a highlight of each CSM.

Outgoing Orthopaedic Section officers—you're all awesome!

csmawards

CSM Award Recipients
Awards were presented at the 2006 Combined Sections Meeting in Boston.

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.

This year there were two recipients for the Outstanding Physical Therapy Student Award.

Our first recipient is **Robin Beauregard.** Ms. Beauregard received her Bachelors of Science degree in Physiological Sciences and Psychobiology from the University of California, Los Angeles. She will graduate in May of 2007 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. Beauregard 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, Robin has also served as a research assistant in the Musculoskeletal Biomechanics Laboratory and has worked to develop a new methodology for analyzing lumbar spine images. In quoting one of her professors, "Robin not only devises well thought out treatment plans but displays the ability to develop a fantastic rapport with her patients." One of her student colleagues notes that Robin is "no ordinary physical therapy student – she is the only person I have ever met who is exceptional at every task she undertakes." Another one of her student colleagues notes that "even though she is a quiet leader, she demonstrates great strength in this role." It is obvious that Robin Beauregard 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.

Our second recipient is **Michelle Kinney**. Ms. Kinney received her Bachelors of Arts degree in Biology and Religion from St. Olaf College in Northfield, MN. She will graduate in May 2007 from the Doctor of Physical Therapy (DPT) program at Washington University in St. Louis, MO. Part of the vision statement for the Washington University DPT program is to prepare new generations of innovative thinking evidence-based practitioners. It is obvious that Ms. Kinney has exceeded the vision set forth by the program through her pursuit of excellence in both the classroom and clinical environments. In addition to balancing the demands of her professional program, Michelle has assisted in developing and managing a pro-bono physical therapy clinic for individuals without insurance, has chaired the Professional Student Leadership Committee, as well as serve on the Medical School Arts Commission. In 2006, she was awarded a 2-month NIH-funded fellowship to participate in clinical research. In quoting one of her professors, "Michelle's personal attributes as well as her achievements to date make me confident that she will develop into a productive physical therapist that will make important contributions to the profession." One of her student colleagues notes, "I personally do not know of another student colleague in our program that is appropriate for this award or who I would be more honored to write a recommendation for." It is obvious that Michelle Kinney 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.

Journal of Orthopaedic & Sports Physical Therapy Awards

2006 JOSPT Excellence in Research Award

Presented to: Rochenda Rydeard, PT, MSc; Andrew B. Leger, PT, PhD; and Drew Smith, PhD

for:

Rydeard R, Leger AB, Smith D. Pilates-based therapeutic exercise: effect on subjects with nonspecific chronic low back pain and functional disability: a randomized controlled trial. *Journal of Orthopaedic & Sports Physical Therapy.* 2006;36(7):472-484.

2006 George J. Davies—James A. Gould Excellence in Clinical Inquiry Award

Presented to: Reg B. Wilcox III, PT, DPT, MS; Linda E. Arslanian, PT, DPT, MS; and Peter J. Millett, MD, MSc

for:

MacDonald CW, Whitman JM, Cleland JA, Smith M, Hoeksma HL. Clinical outcomes following manual physical therapy and exercise for hip osteoarthritis: a case series. *Journal of Orthopaedic & Sports Physical Therapy.* 2006;36(8):588-599.

Teaching Orthopaedic Physical Therapy Award

This award is given to recognize and support excellence in instructing OPT 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.

Gregory S. Ford, PT, DPT, MS, OCS is the 2007 recipient of the James A. Gould III Excellence in Teaching Orthopaedic Physical Therapy Award. Dr. Ford is an Assistant Professor in the Department of Physical Therapy at Daemen College in Amherst, NY. As a faculty member teaching in both the entry-level and post-professional DPT programs, Dr. Ford epitomizes the role of a teacher, mentor, clinician, and clinical researcher.

Since joining the Physical Therapy Department at Daemen College in 2001, Dr. Ford has served as an instructor in numerous facets of the academic program. He has been an instructor for the *Kinesiology, Biomechanics, Musculoskeletal Rehabilitation, Diagnostic Imaging,* as well as *Spinal Disorders* courses. His colleagues note "Greg's teaching style actively engages students in the learning experience and encourages the development of critical thinking skills necessary for clinical practice." He utilizes innovative and well-designed teaching materials, including group case studies, to support content delivery in lecture and laboratory sessions. As noted by another of his colleagues, "in all my interactions with Greg, I have found him to always be energetic, thoughtful, and dedicated to his academic and clinical skills in orthopaedic physical therapy."

Both current and former students speak highly of Dr. Ford's dedication and knowledge in the area of musculoskeletal physical therapy. One student states, "not only is Dr. Ford a superb academic professor, clinician, and research advocate, he is a dedicated mentor and role model for his students." Another former student writes, "Dr. Ford exemplifies the characteristics of a great teacher with the utmost enthusiasm and dedication."

It is obvious that Gregory S. Ford is a most worthy recipient of the James A. Gould Excellence in Teaching Orthopaedic Physical Therapy Award. With this award, Greg Ford joins a distinguished group of faculty and clinical mentors in orthopaedic physical therapy.

Richard W. Bowling—Richard E. Erhard Orthopaedic Clinical Practice Award

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

In recognition of this award being named in their honor, the recipients of the 1st Richard W. Bowling – Richard E. Erhard Orthopaedic Clinical Practice Award are Richard W. Bowling, PT, MS and Richard E. Erhard, PT, DC. Richard W. Bowling (Rick) and Richard W. Erhard (Dick), affectionately known as the "Rick and Dick show," have made lasting contributions to orthopaedic PT practice through innovative clinical practice, education, and research that has substantially impacted the current practice of orthopaedic physical therapy.

Rick Bowling received a Bachelor of Science degree from Kent State University, where he also lettered in football and he received a certificate in physical therapy from the D.T. Watson School of Physiatrics in 1966. In 1981, he received a Masters of Science degree from the University of Pittsburgh with an emphasis in orthopaedic physical therapy. As part of his Master's degree, Rick developed and expanded the orthopaedic physical therapy track in the advanced Master's degree program at the University of Pittsburgh. Until his retirement, Rick was actively involved in the clinical practice of physical therapy that included serving as a director of a hospital physical therapy department and owner of a physical therapy practice. Most recently Rick was the Chief Executive Officer of the Center for Rehab Services, which is an innovative partnership with University of Pittsburgh Medical Center and the Department of Physical Therapy at the University of Pittsburgh that provides unique clinical practice, education, and research opportunities for physical therapists. Rick was a long-standing member of the Orthopaedic Section and served on the first Orthopaedic Specialty Council Board. Rick was always quiet and unassuming; however, when he spoke everyone listened because his words would invariably move the discussion forward to another level.

Dick Erhard received his Bachelor of Science degree from Thiel College in 1964 and received his certificate of physical therapy from the D.T. Watson School of Physiatrics in 1964. He received a Doctor of Chiropractic degree from Logan College of Chiropractic in 1983. Throughout his career, Dick was actively involved in innovative clinical practice that included serving as a director of a hospital and outpatient physical therapy department and owner of a physical therapy practice. Most recently, Dick served as director of physical therapy and chiropractic services for the University of Pittsburgh Spine Specialty Center. Dick served as an assistant professor in the University of Pittsburgh Department of Physical Therapy from 1983 to 2005, where he was involved in teaching orthopaedic manual therapy. Dick has also served as an adjunct faculty for many physical therapy programs across the country. Dick is a long time member of the Orthopaedic Section. He was one of the founding fathers of the American Academy of Orthopaedic Manual Physical Therapy and served as the first President of the International Academy of Orthopaedic Manual Physical Therapy. Dick is an expert diagnostician and is known for his ability to solve complex clinical problems, as well as for his clinical teaching abilities to pass these skills on to others.

Rick and Dick have taught orthopaedic physical therapy to countless physical therapists throughout southwestern Pennsylvania and across the United States. Many physical therapists look to Rick and Dick as their mentors. Mentor is a word that is often overused. A mentor is not only an expert, but is someone who is willing to challenge present thinking. Above all, a mentor is someone who gives and is willing to pass on his knowledge to others. When a mentor passes on his knowledge, he not only helps others grow and develop, but he spreads his knowledge and skill, producing a rippling effect. An example of this "rippling effect" is the work that Rick and Dick did to develop a treatment-based classification system for the evaluation and treatment of low back pain, which has served as the basis to enhance evidence-based physical therapy for the management of low back pain. Their mentorship has directly influenced the work of individuals such as Delitto, Flynn, Fritz, Wainner, Childs, Hicks, and George, who in turn have influenced many other physical therapists. In this manner, Rick and Dick have truly impacted the practice of orthopaedic physical therapy and it is for this that the Orthopaedic Section established the Richard W. Bowling - Richard E. Erhard Orthopaedic Clinical Practice Award. The Orthopaedic Section is pleased to present this first award to Richard W. Bowling and Richard E. Erhard.

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 an APTA Combined Sections Meeting.

The Orthopaedic Section's Paris Distinguished Service Award for 2007 is being presented to Z. Annette Iglarsh, PT, PhD, MBA. Dr. Iglarsh is currently a Professor in the Department of Physical Therapy and in the Program in Health Policy at the University of the Sciences in Philadelphia, Philadelphia, PA. She served as the Chair of the Physical Therapy Department from 1997 to 2004.

Annette has served the Orthopaedic Section with distinction in various capacities beginning in 1986. Serving as the Chair of the Section's Program and Education Committee from 1986 to 1992, Annette was responsible for developing the Home Study Course series as well as the Review for Advanced Clinical Competencies course. Both of these programs not only provided a tremendous benefit to the membership but also helped to create significant revenues for the Section that allowed for future growth. In her role as Program Chair, Annette also oversaw the continued development of clinically relevant and research-based Orthopaedic Section programming at the Combined Sections Meeting during a period when the Section membership was increasing from 8,000 to almost 12,000 members. In 1992, Annette assumed the role as Section President and again demonstrated the foresight and hard work necessary for the Section to continue to grow. Under her leadership as President, the Section established the first three Special Interest Groups as well as the Advisory Council for JOSPT and the Section finally achieved a long-term goal of financial solvency. While serving as President, Annette was a driving force behind the acquisition of the property, hiring of the architects, and the development of the construction plans for the Orthopaedic Section building in La Crosse, WI, that serves as home to our Section office.

As one of her nominators noted, "my principle reason for nominating Annette was her continued stellar contribution to the profession – so many past Presidents seem to fade away after they finish their term as President – but not so with Annette!" Indeed, after finishing her term as Orthopaedic Section President in 1995, Annette was elected to the APTA Board of Directors for two three-year terms. At the completion her last term as a Director, she continued to serve the association as a member of the Executive Committee of the APTA Board of Directors. As another of her nominators so appropriately noted "Annette has a wonderful ability to both create and implement wonderful ideas that are new and innovative – the Section has been the beneficiary of Annette's terrific skills for many years."

In recognition of Annette'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 fitting that Annette receives this prestigious Section Award.

Rose Excellence in Research Award Orthopaedic Section, APTA

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 sciences, applied science, or clinical research.

The recipient of the 2007 Rose Excellence in Research Award is **Gerard P Brennan, PT, PhD** for a manuscript entitled: Identifying subgroups of patients with acute/subacute "nonspecific" low back pain: results of a randomized clinical trial. *Spine*. 2006;31(6):623-631. The co-authors of this article are Julie M. Fritz, PT, PhD, ATC; Steven J Hunter, PT, MS, OCS; Anne Thackeray, PT; Anthony Delitto, PT, PhD, FAPTA; and Richard E Erhard, PT, DC.

Dr. Brennan is the Director of Clinical Quality and Outcomes Research for the Rehabilitation Agency at Intermountain Healthcare. He is a member of the American Academy of Orthopaedic and Manual Physical Therapists and an adjunct faculty member at the University of Utah and the University of Pittsburgh. After Dr. Brennan completed a Master of Science in Physical Therapy at Duke University in 1975, he and his wife moved west, where he completed his PhD in Exercise Physiology at the University of Utah in 1985. In reflecting on his 31 years of practice, Dr. Brennan describes his philosophy of care as "rooted in quality improvement and clinical research, especially in the treatment of patients with spinal dysfunction." Dr. Brennan has made numerous scientific presentations at state and national meetings and has lectured at the graduate level on Orthopaedics, Manual Therapy, Exercise Science, and Quality Improvement. He maintains an active clinical research agenda in areas related to classification of patients with low back pain, spinal manipulation, quality improvement, and treatment effectiveness studies. He has received research grants from the Deseret Foundation and private funding. Dr. Brennan has published over 10 peer-reviewed manuscripts. He is currently a member of several national organizations, including the American Physical Therapy Association (APTA), the American Academy of Orthopedic Manual Physical Therapists (AAOMPT), and the Orthopaedic and Research Sections of the APTA. He is currently the Program Chair and Vice President of the Section on Research for the APTA. He enjoys reading and spending time with his family in the deserts and mountains near his home in Salt Lake City, UT.

Fundraiser for the Monority Scholarship Fund

The Fifteenth Annual Fundraiser for APTA's Minority Scholarship Fund *Celebration of Diversity* is scheduled for Saturday, October 6, 2007 at the Science Museum of Minnesota in St. Paul, MN. The fundraiser is being co-hosted by the Academic Administrators and Clinical Education Special Interest Groups of the Section for Education. Single ticket prices for the dinner/dance are $100. Contributions of any amount are welcome. You can also participate by donating items for the Silent Auction. Ad space in the souvenir book may be purchased at $500 for a full page, $250 for ½ page, and $100 for a business card. For further information, please contact APTA's Department of Minority/International Affairs at 800/999-2782 ext 8554.

BOARD OF DIRECTORS CSM MEETING MINUTES

FEBRUARY 15, 2007

Michael Cibulka, President, called a regular meeting of the Board of Directors of the Orthopaedic Section, APTA, Inc. to order at 6:00 PM, February 15, 2007.

Present:
Tom McPoil, Vice President
Joe Godges, Treasurer
Jay Irrgang, Director
Bill O'Grady, Director
Lori Michener, Research Chair
Bob Rowe, Practice Chair
Ellen Hamilton, Education Chair
Beth Jones, Education Vice-chair/Incoming Education Chair

Tara Fredrickson, Executive Associate
Terri DeFlorian, Executive Director

Absent:
Steve McDavitt, APTA Board Liaison

The January 8, 2007 Board of Directors Conference Call Meeting minutes were approved as printed.

The meeting agenda was adopted as modified.

The January 14, 2007 Board of Directors Conference Call Meeting minutes were approved as printed.

The time and date of the next Board of Directors conference call meeting will be Thursday, March 22, 2007 at 12:30 PM CST.

Guest, Nancy White, outgoing President of the Foundation for Physical Therapy, presented on the launching of a capital campaign to raise $4 million for a research endowment fund supported by the Foundation, a portion of which may be designated for musculoskeletal research. A Scientific Advisory Committee is being formed to provide direction for future research priorities for the Foundation. The Foundation is asking the Orthopaedic Section to commit to supporting this initiative and to consider development of an endowment to support research related to orthopaedic physical therapy. The Foundation is also approaching other Sections to support the initiative. The Foundation would like to report to their Board in March that they have 100% participation from all Sections. The Orthopaedic Section Board of Directors will discuss this on their March conference call.

Guest, Tim Lyons, APTA Treasurer, was present to answer the Board's questions on the CSM agreement. The new agreement limits the number of hours of programming for each Section. As a result of this limitation, the Orthopaedic Section may need to reduce the number of hours of programming that it sponsors at future Combined Sections Meetings. The limitation in hours has become necessary because CSM has grown in size to the point were the number of cities that could host CSM is becoming more and more limited. There is the possibility that the Section could increase programming beyond the maximum limit by borrowing unused hours from other Sections. The contract will be reviewed periodically. The Orthopaedic Section Board of Directors will discuss this further on their March conference call.

Guest, Rob Landel, outgoing Orthopaedic Specialty Council Chair, presented on the revised criteria for the Orthopaedic Specialist Exam which will go before the ABPTS Board at their meeting in March. The Board commended Rob on a job well done.

=MOTION 1= Joe Godges, Treasurer
The Orthopaedic Section Board of Directors added $59,000 to the 2007 budget for expenses incurred in 2007 related to the ICF project. ADOPTED (unanimous)

=MOTION 2= Lori Michener, Research Committee Chair
The Orthopaedic Section Board of Directors approved the following grants for 2007 funding:
1) Validation of a clinical prediction rule to identify patients with neck pain likely to benefit from thoracic spine thrust manipulation: A randomized clinical trial. Amount granted - $9,500
PI: Josh Cleland
Co-Investigators: Julie Whitman, John Childs
2) Effects of proximal and distal tibiofibular joint manipulation on lower extremity muscle activation, ankle ROM, functional outcome scores in individuals with chronic ankle instability. Amount granted - $10,000

BOARD OF DIRECTORS CSM MEETING MINUTES

FEBRUARY 15, 2007

PI: James Beazell, Chris Ingersol
Co-Investigators: Eric Magrum, Lindsay Drewes, Terry Grindstaff, Jay Hertel
3) Measurement of median nerve conduction velocity before, during, and after repeated application of the ULTT in healthy adults and patients with complex regional pain syndrome Type I. Amount granted - $10,000
PI: Nancy Quick
Co-Investigator: Sally McCormack
ADOPTED (unanimous)

Mr. Irrgang presented the revised Service and Fee Agreement between the Orthopaedic and Sports Physical Therapy Sections and *JOSPT.* There was nothing further to discuss so the documents will be presented to the *JOSPT* Board of Directors at their March meeting.

=MOTION 3= Tom McPoil, Vice President/ISC Board Liaison
The Orthopaedic Section Board of Directors pay Chris Hughes, incoming ISC Editor, $100 per hour for work done on monographs he is not officially responsible for prior to July 1, 2007 when he takes over as ISC Editor. ADOPTED (unanimous)

=MOTION 4= Robert Rowe, Practice Chair/Section House of Delegate Representative
The Orthopaedic Section Board of Directors support an APTA 2007 Bylaw Amendment –

(detail can be found at orthopt.org)

=MOTION 5= Joe Godges, Treasurer
The Orthopaedic Section Board of Directors accept the Finance Committee's recommendation to add Marcie Hayes as the new Finance Committee member beginning in 2007. ADOPTED (unanimous)

Mr. Irrgang gave an update on the ICF project. The Board of Directors agreed that a task force needs to be formed in order to keep the ICF project moving forward as Jay Irrgang will have limited time to devote to this project with his increased responsibilities as President. Formation of a task force will be determined on the March 22, 2007 Board of Directors conference call.

=MOTION 6= Jay Irrgang, President
The Orthopaedic Section Board of Directors will hold the 2007 Fall Board of Directors meeting in Pittsburgh, PA. ADOPTED (unanimous). It was suggested that each year a different Board member consider hosting this meeting in his/her home town.

The Task Force report on holding an Annual Orthopaedic Section Meeting beginning in 2008 will be discussed on the March 22, 2007 Board of Directors conference call.

Discussion of a third face to face meeting of the Board of Directors in 2008 was postponed to the March 22, 2007 Board of Directors meeting.

Review of the To Be Competed List was postponed to the March 22, 2007 Board of Directors meeting.

The meeting adjourned at 8:00 PM CST.

Submitted by Terri DeFlorian, Executive Director

meetingminutes

Orthopaedic Section, APTA, Inc.
CSM 2007 Annual Membership Meeting Minutes

BOSTON, MASSACHUSETTES
FEBRUARY 17, 2007

I. CALL TO ORDER AND WELCOME – President, Michael Cibulka, PT, DPT, MHS, OCS

A. The agenda was approved as printed.

B. The Annual Membership Meeting minutes from CSM in San Diego, California on February 4, 2006 were approved as printed in Volume 18:1:06 issue of *Orthopaedic Physical Therapy Practice.*

C. Orthopaedic Section Election Results – Nominating Committee Chair, Pam Duffy, PT, MEd, OCS, RP
For the Fall 2006 election there were 908 ballots cast. The number of valid ballots was 896 and the number of invalid ballots was 12. The total number of ballots sent was 13,389. The return rate was 6.7%. The following positions were elected: President, James Irrgang; Vice President, Tom McPoil; Nominating Committee Member, G. Kelley Fitzgerald. In addition all 9 bylaw amendments were approved.

The floor was opened for nominations for next year's elections for the positions of Treasurer, Director and Nominating Committee member. No nominations were received.

The deadline for accepting nominations for the Fall 2007 election is September 1, 2007.

II. INVITED GUESTS

A. Jay Segal, PT-PAC Chairman, gave an update on the PT-PAC fund raising efforts, specifically that the PAC is campaigning to get 100% participation from all APTA members.

B. Nancy White, PT, MS, OCS, Immediate-past President of the Foundation for Physical Therapy, gave an update on the Clinical Research Network. One of the outcomes of this project was the training of new researchers. The Foundation has formed a Scientific Advisory Committee to set research priorities. They are planning to hold a retreat and invite representatives from all Sections to get their input. Currently 38% of all APTA members contribute to the Foundation and 40% of this money goes towards musculoskeletal research.

C. David Greathouse, President of the *JOSPT* Board of Directors
- Announced the new format of the Journal which began with the January 2007 issue.
- There will be a Read for Credit offering beginning with the April 2007 issue.
- Guy Simoneau, *JOSPT* Editor-in-Chief, will continue as the Editor for another 3 years.
- The goal of the Journal to increase the number of manuscripts published each year was accomplished.
- The goal to increase the number of manuscripts submitted was accomplished.
- The average time a manuscript spends in the review process has decreased.
- The impact factor at the end of 2005 was 1.395.

III. BOARD OF DIRECTOR REPORTS

A. Michael Cibulka, President, gave a farewell address as his 2 three-year terms as President comes to a close at the end of the CSM Membership Meeting.

B. James Irrgang, Director
Announced the new Richard W. Bowling – Richard E. Erhard Orthopaedic Clinical Practice Award.

Information on the ICF project can be found on the Orthopaedic Section web site. Manuscripts will be ready for review and publication in the future.

There are some changes being made to *JOSPT* which will allow continued growth of the Journal as well as enable it to remain the highest member benefit.

A new Orthopaedic Section Meeting is being investigated for April/May of 2008. More details will become available through *Orthopaedic Physical Therapy Practice* and the Section web site.

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

IV. RECOGNITION OF BOARD OF DIRECTORS AND COMMITTEE CHAIRS

The following Board members and Committee Chairs were recognized for their service to the Section as their terms end at the close of the CSM Membership Meeting –
- Michael Cibulka, PT, DPT, MHS, OCS, President
- Scott Adam Smith, MPT, Membership Chair
- Ellen Hamilton, PT, OCS, Education Chair
- Mary Ann Wilmarth, PT, DPT, MS, OCS, MTC, Cert-MDT, ISC Editor
- Pamela Duffy, PT, MEd, OCS, RP, Nominating Committee Chair

Ellen Hamilton was recognized as the new Director to the Board filling the vacancy left by James Irrgang who was elected President.

ADJOURNMENT 11:00 AM

treasurer's report

Joe Godges, DPT, MA, OCS

Provided is a brief synopsis of the "State of the Section's Finances." The figures for 2005 and earlier, rounded off and presented here are taken from audit reports produced by the accounting firm, Gillette and Associates of La Crosse, WI, that performs a full audit of the Orthopaedic Section's finances and financial procedures each year.

- Pertinent Orthopaedic Section financial information from the recent past:

Total Assets as of December 31, 1999:	2,816,000
Total Assets as of December 31, 2000:	2,584,000
Total Assets as of December 31, 2001:	2,219,000
Total Assets as of December 31, 2002:	2,017,000
Total Assets as of December 31, 2003:	2,259,000
Total Assets as of December 31, 2004:	2,351,000
Total Assets as of December 31, 2005:	2,763,000
Total Loss in Assets Jan 1999-Dec 2002:	(799,000)
Total Gain in Assets Jan 2003-Dec 2003:	242,000
Total Gain in Assets Jan 2004-Dec 2004:	92,000
Total Gain in Assets Jan 2005-Dec 2005:	412,000

The Income to Expense tables below provide our recent history. We experienced noteworthy growth in membership dues income, and independent study course income remained strong, all while maintaining our costs at a reasonable level. This is commendable. Our members and staff continue to make belonging to our Section valuable. Thank you. In addition, a big thank you is owed to the independent study course authors, advisory panel, and production team. Major compliments are also due to our Section staff—Terri DeFlorian, Tara Fredrickson, Sharon Klinski, Kathy Olson, and Carol Denison—for spearheading the income gains while maintaining our expenses at a low level.

- Income/Expense Comparisons

	Income	Expenses
1999	1,441,000	1,435,000
2000	1,297,000	1,493,000
2001	1,241,000	1,493,000
2002	1,196,000	1,246,000
2003	1,173,000	1,245,000
2004	1,176,000	1,134,000
2005	1,447,000	1,128,000
2006	1,553,000	1,246,000

- Income from Members' Dues:

Jan to Dec 31, 2000:	$512,000
Jan to Dec 31, 2001:	$541,000
Jan to Dec 31, 2002:	$549,000
Jan to Dec 31, 2003:	$568,000
Jan to Dec 31, 2004:	$568,000
Jan to Dec 31, 2005:	$591,000
Jan to Dec 31, 2006:	$683,000

- Independent Study Courses Registration Income:

Registration – HSC – income in 2000:	$604,000
Registration – HSC – income in 2001:	$438,000
Registration – HSC – income in 2002:	$269,000
Registration – HSC – income in 2003:	$290,000
Registration – HSC – income in 2004:	$335,000
Registration – HSC – income in 2005:	$411,000
Registration – HSC – income in 2006:	$374,000

The long-range financial goal of the Finance Committee and the Board of Directors is to build our assets to ensure that we are able to optimally accomplish the practice, research, and education goals of our Section. We are heading in the right direction. For example, in 2006 we have added $270,000 to our Section's "Research Endowment Fund" to enable the Section make consistent and substantial annual contributions to research activities from the income generated by this fund.

In summary, we are doing well.

occupationalhealth

SPECIAL INTEREST GROUP

GREETINGS OHSIG MEMBERS:

Combined Sections Meeting February 14-17 in Boston was energizing and full of networking and educational opportunities! OHSIG educational programming took place, the OHSIG Board of Directors met, and OHSIG general business meeting was held. A few updates for you include:

Task Force Updates:

1) OSHA Alliance – Ken Harwood and Mary Fran Delaune from APTA's Practice Committee, attended the OHSIG Board Meeting and provided an update of their meetings with OSHA. During their last meeting, OSHA announced that they are no longer interested in alliances related to ergonomics. There is opportunity to work with specific regions, and this avenue will be pursued. Kathy Rockefeller and Drew Bossen, OHSIG Task Force Co-Chairs, will continue to work with APTA. Stay tuned.

2) Occupational Health Specialization Certification – The Summary Practice Analysis manuscript is in process of final review, with plans to proceed with publication. OHSIG officers are in process of completing the petition to ABPTS (American Board of Physical Therapy Specialists) to develop a specialization certification in Occupational Health PT. Stay tuned!

OHSIG thanks Dee Daley, OHSIG Education Chair, for great programming. We also thank the following speakers for sharing their expertise: Dee Daley, Drew Bossen, Kathy Rockefeller, Deborah Lechner, and Helene Fearon.

The OHSIG welcomes new board members:
Secretary—Joe Kleinkort
Nominating Committee Member—Steve Allison

OHSIG thanks Barb McKelvy, outgoing secretary, for her years of service to OHSIG serving as secretary. Barb will continue to be active with OHSIG. She is involved in the Practice Analysis manuscript and on the Specialization Certification Task Force.

OHSIG thanks Frank Fearon, outgoing Nominating Committee member and past Research Committee Chair, for his years of service to OHSIG. Our many thoughts are with Frank and his family.

OHSIG members consider attending APTA National Conference in Denver, June 27-30. Safe Patient Handling: Strategies for Integrating Safety Into the Rehabilitation Setting. Speakers: Ken J Harwood, PT, PhD, CIE, APTA, Alexandria VA; Audrey Nelson, PhD, RN, FAAN, Patient Safety Center of Inquiry, Tampa FL; Kathleen Rockefeller, PT, ScD, MPH, University of South Florida, Tampa FL.

Sincerely,
Margot Miller, PT
OHSIG President

WORK INJURY CONTAINMENT PROGRAMS: CONTAINING THE INJURY AND THE COSTS!!!

Nicole Matoushek

IMPACT OF WORK-RELATED INJURIES ON INDUSTRY

According to the Occupational Safety and Health Administration, every year workplace injuries, illnesses, and deaths cost our nation $170 billion (U.S. Dept. of Labor). There are direct costs and indirect costs associated with all workplace injuries. Direct costs are those payments made to the employee and medical care providers. Indirect costs refer to the costs associated with lost productivity, training, administrative time, reduced product quality, overhead costs, legal fees, and increased insurance premiums. In 2001, the economic burden to our nation from over-exertion injuries or injuries caused by excessive pushing, pulling, lifting, holding, or carrying resulted in $9.8 billion in direct costs. Repetitive motion injuries totaled $2.3 billion in direct costs. And in 2001, Liberty Mutual noted in their Mutual Workplace Safety Index that the indirect costs associated with all of these ergonomic injuries accounted for $39 billion.

There is a direct relationship between workplace safety and a company's performance and profits. As workplace injuries increase, the injury claims increase and profits suffer. Company safety and ergonomic programs can reduce injuries and increase company bottom line profits. In fact, according to the U.S. Department of Labor, reportedly estimates that a good safety and health program can save $4 to $6, for every one dollar invested. The direct results from these programs include: reduced workers' compensation and medical costs, diminished absenteeism, less employee turnover, decreased training costs, and improved productivity and employee morale.

ERGONOMICS AND INJURY CONTAINMENT

Ergonomics is useful in managing workplace injuries to control and contain injuries and the associated costs. By using ergonomics in injury management, injured workers are able to safely and promptly return to productive work duties with a reduced chance for reinjury, or injury progression. This in turn, reduces the indemnity costs associated with lost time injuries, increases employee performance, and reduces direct medical costs related to treating subsequent injuries as a consequence of continued exposure to ergonomic risk factors.

Traditionally, ergonomics has been primarily used in the workplace for injury prevention. Ergonomic committees and safety teams have primarily focused efforts on identifying high risk jobs and controlling ergonomic risks to reduce the rate at which work-related injuries occur and the resultant costs associated with these injuries. For example, the ergonomics team may identify that injury rates have increased on a particular production line when compared to prior year incidence rates. This increased injury rate results in decreased production and increased the workers' compensation costs. In this scenario, ergonomic efforts would focus on preventing new work-related injuries from occurring on this line.

Applying ergonomics to injury management and return to work, once a work-related injury has occurred, can have an even greater affect on work-related injury costs when compared to only using the traditional injury prevention approach. As an example, the cost of an injury for a worker who has sustained a shoulder strain injury due to exposure to ergonomic risk factors such as high repetition, forceful exertions, and positional strains may easily escalate out of control, if the injured worker is unable to safely return to work or the ergonomic issues are not addressed. On the other hand, if these ergonomic risk factors of high repetition, forceful exertions, and postural strain are reduced to allow sufficient tissue healing with return to work, the cost savings can be significant.

INJURY CONTAINMENT DEFINED

The concept of injury containment is based on the premise that if ergonomic issues are not addressed when an injured worker returns to work, the current injury and the associated costs may continue to progress and escalate. However, if the ergonomic risk factors that are associated with the original injury are addressed and reduced, then the injury will heal sufficiently, and not worsen. The work-related injury is, therefore, 'contained.' Injury containment is a process which enables the evaluator to identify and control some of the factors that can influence the injury progression. This concept is further illustrated in the following paragraph.

Often, when a worker is injured due to exposure to ergonomic risk factors, he or she is taken off work temporarily or assigned to restricted work duty. Over time, the injury heals either partially or completely, and the injured worker is returned to work at full duty with full exposure to the ergonomic risk factors that may have caused the development of the original injury. If these ergonomic risk factors are not identified and controlled, there is a heightened potential that the original injury may reoccur. In other scenarios, with repeated exposure to ergonomic risk factors, the injury may progress from a mild, relatively easy to treat disorder to a severe or catastrophic injury that may be costly and difficult to manage. In the case of reinjury, a worker may experience repeated injury to the same body part multiple times. With each reinjury to the same area, this body part becomes more susceptible to further trauma, potentially delaying or impeding the healing process. This in turn results in higher costs associated with not only the rehabilitation, but also with the direct and indirect costs associated with the injury.

For example, a worker has sustained a wrist injury and is diagnosed with wrist strain. The injury has developed from exposure to the ergonomic risk factors of high repetition, forceful grasping, and repeated wrist flexion and wrist extension. If the injured worker returns to full work duty, and full exposure to these risk factors, the wrist may be weakened and more susceptible to reinjury or further injury if the ergonomic risk exposure is not controlled. Over time, the wrist injury may not heal or a mild wrist strain may progress to carpal tunnel syndrome, or may even require a carpal tunnel release and extensive rehabilitation. As the injury continues or progresses, the length of time away from work and productive duties increases and the average cost per injury claim increases.

The average cost per injury claim for a mild wrist injury, such as wrist strain is $8,000.[1] The average cost per injury claim for a moderate wrist injury, such as carpal tunnel syndrome is $14,000.[1] However, severe injuries such as carpal tunnel release, including; surgery, compensation, therapy, legal fees, administrative costs and settlements approach $250,000 as documented by Lauren Hebert, PT, OCT who as specialized in Occupational Health for over 30 years.

By using ergonomic applications to identify and reduce the ergonomic risks that produce excessive strain to the wrist, the wrist injury can be 'contained,' thereby, reducing escalation of the problem and the associated costs. This concept is called 'Injury Containment,' since ergonomic implementation controls and contains the injury progression and the rising costs that result. The cost savings associated with injury containment for the wrist is illustrated in the figure below.

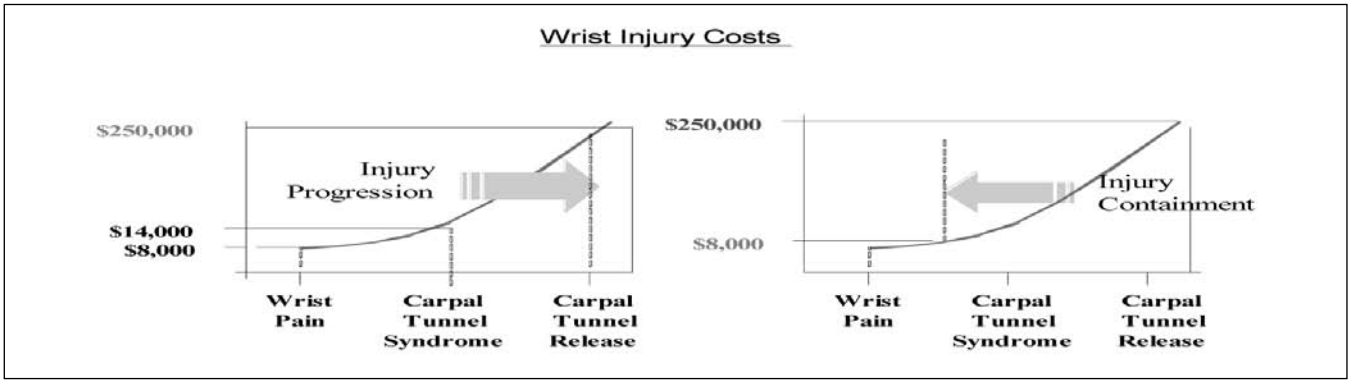


Figure 1. Injury containment. As an injury progresses from a mild condition to a more severe condition, the costs of the injury escalate. This is illustrated as the costs of the wrist injury increase significantly as the injury progresses from "pain" to "carpal tunnel syndrome" to a "carpal tunnel release". Injury containment works by controlling the injury, therefore preventing the severe injury from occurring and containing the costs.

INJURY CONTAINMENT PROGRAMS

An injury containment program is designed to provide immediate identification and work modifications for injured workers who are returning to work and may be at risk for further injury or injury progression. The goal of the program is to assess the worker's specific work practices, work tasks, work environment, ergonomic factors, and injury characteristic factors as they relate to the essential functions of the job. All of these factors can affect the progression of a work-related injury. In addition, at least in part, these factors can be modified to reduce the likelihood of injury progression, and therefore, contain the injury.

The injury containment program is designed and appropriate for all injured workers who are returning to work from an injury, and who may be considered 'high risk' for reinjury.

COMPONENTS OF THE WORK INJURY CONTAINMENT PROGRAM

A work injury containment program is performed at the workplace with the injured worker. The work injury containment program is divided into several components:

- ***Work Task Data***
- ***Musculoskeletal Assessment***
- ***Observed Job Tasks***
- ***Ergonomic Risk Factors***
- ***Injury Risk Characteristics***
- ***Recommendations***

The program is similar to an ergonomic risk assessment and functional capacity evaluation, but focuses on the injured worker and the ergonomic risk factors associated with the work tasks and injury.

SUMMARY

The work injury containment program is an overall assessment of the complex interaction among the worker, the specific diagnosis, the clinical findings, the critical job demands, the injury risk assessment, ergonomic risk factors, and return to work. The program evaluation focuses on the overall assessment to determine if modifications to the job and/or adaptive equipment are recommended for the safe and effective return to work of the injured worker. It is clear that this process is beneficial to both the employer and the employee.

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RESOURCES

ErgoRehab, Inc www.ergorehabinc.com
Lauren Herbert, PT, OCT www.smartcarept.com

Nicole Matoushek has 12 years collective experience as a physical therapist in workers' compensation, ergonomics, return-to-work, utilization management, consulting, and program development. She can be reached at www.ergorehabinc.com.

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CONTROVERSIES IN CHRONIC ANKLE INSTABILITY

Christopher R. Carcia, PhD, PT, SCS
RobRoy L. Martin, PhD, PT, CSCS
Duquesne University

Studies examining the etiology and prevention of recurrent sprains have received considerable attention over the last decade for a number of reasons. Lateral ankle sprains occur more frequently than any other musculoskeletal injury in sports.[1] Problems associated with recurrent injury[2] and chronic symptoms have been well documented.[3-5] Traditional theories suggest chronic ankle instability (CAI) is influenced by decreased proprioception, weak musculature surrounding the ankle and foot, and/or a delayed neuromuscular reflex response. Contemporary theories on the other hand emphasize the role of anticipatory muscle contraction associated with a 'feedforward' mechanism in injury prevention and rehabilitation.

Evidence available to date has outlined flaws with the traditional theories behind CAI. Injection of anesthetic into the lateral ankle ligaments did not detrimentally affect ankle proprioception.[6,7] Other work has failed to identify differences with threshold to detection of passive movement in subjects with CAI.[8] Studies have failed to identify deficits in evertor torque in subjects with CAI compared to normals.[9,10] Also, research has indicated a reflexive response alone is to slow to effectively protect the ankle from injury.[11]

The role of anticipatory muscle contraction and a 'feedforward' mechanism is an area of growing interest. Anticipatory muscle contraction increases active muscle stiffness and hence joint stiffness while simultaneously increasing the sensitivity of the muscle spindle to stretch. Therefore, the active stiffness assists with stabilization immediately upon impact and then upon impact/perturbation, a heightened reflex response occurs given the sensitivity of the spindle (gamma activation) and this reinforces the stiffness. The mechanisms work together to provide joint stability.[12] Konradsen et al demonstrated that anticipatory contraction of the peroneal musculature significantly decreased the response time (89 ms) necessary to generate a comparable amount of eversion torque at the ankle when compared to a relaxed state (135 ms).[13] Given the benefits of anticipatory muscle contraction (increased stiffness and decreased response time) interventions that are capable of producing this response would therefore seem desirable.

How to train individuals so they exhibit an anticipatory response is unclear, however, perturbation training may prove to be useful. Perturbation training is advocated as part of a nonoperative rehabilitation program for anterior cruciate ligament (ACL) injuries.[14] Perturbation training, which exposes the joint to destabilizing forces, is thought to activate the afferent mechanism associated with this response.[12,15] The goal of this type of training is to produce an involuntary coordinated co-activation of the muscles that surround the joint. This co-activation stiffens the joint to help maintain its stability.[16]

Perturbation treatment used in the ACL have been outlined in detail by Fitzgerald at al.[15] This training program basically involves introducing forces and torques to the lower extremity in multiple directions at multiple speeds while the subject attempts to equally resist the force in the opposite direction. The technique is thought to be similar to proprioceptive neuromuscular facilitation-rythmic stabilization techniques.[15] The tasks involved with this program can be progressed from double limb to single limb support. Tasks can also be made more difficult by adding sport specific activities with the perturbation training.

While unknown, it is possible that similar perturbation training in subjects with CAI may prove to be useful. Several studies have established that ankle disk exercises decrease injury incidence in trained subjects.[17-19] While the exact mechanism is unclear, it is plausible the training augments anticipatory muscle activity and this is what is responsible for the decreased injury rate. However, it seems warranted that interventions that include perturbation training should be examined in a prospective manner to determine their usefulness in a rehabilitation program for individuals with CAI.

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painmanagement

SPECIAL INTEREST GROUP

PRESIDENT'S MESSAGE

John E. Garzione, PT, DPT, DAAPM

The close of CSM this year brought many changes of new officers in both the Orthopaedic Section as well as within the SIGs. I would like to again extend a special thank you to our past President, Joe Kleinkort for all his hard work and mentoring over the past 6 years. Thanks also to our previous officers Elaine Pomerantz, Secretary and Scott Van Epps, Treasurer for their work.

Congratulations go to Marie Hoeger Bement who was elected Vice President/Program Chair; Ann Ingard, Secretary; and Laura Frey Law, Treasurer. Greg Dedrick has agreed to share research findings with us through this newsletter. I look forward to working with all of you this term.

The program entitled "Headaches and the Cervical Spine" by Marian Brame, MA, PT was well attended and very informative. This 4-hour course presented a biomechanical approach to the evaluation and management of cervicogenic headaches. If you missed this program at CSM, it is available on audiotape.

About 10 years ago, the Pain Management SIG Board of Directors hoped to enhance programming at CSM by introducing physical therapists to complimentary therapies such as: laser, nutritional supplements, acupuncture electrical stimulation, spirituality, etc. This was met with loud resistance from some of the former members and the course ideas were not pursued. Looking back over the past 2 CSMs, I have identified over 14 presentations on those very topics presented by other Sections, not counting platform presentations. This tells me that: (1) this SIG is ahead of its time in its thinking, (2) clinicians in all Sections are interested in these topics, and (3) even though there is a paucity of evidence to support the use of complimentary treatments, they do have efficacy for some patient populations. Pain management clinicians are always looking for new ways to reduce pain and suffering for our patients.

I am proud to say that some of the finest pain researchers and clinicians in this country are members of this SIG. I hope that we can all pull together to advance the clinical treatment of pain supported and fostered by research and common sense.

TREATMENT OF CHRONIC NECK PAIN

Keeping with the theme of this year's CSM program of treatment to the cervical spine, I decided to do a Cochrane Database literature review of studied treatments for neck pain. The studies selected had to be randomized (RCT) or quasi–randomized investigating the use of: (1) manipulation or mobilization as a treatment for mechanical neck disorders (MND), (2) the effects of electrotherapy as a treatment for MND, (3) exercise therapy as a treatment of MND with or without headache or radicular signs and symptoms, and (4) massage as a treatment for MND.

The first review done in 2004[1] concluded that of the 42% high quality trials of 33 studies selected for inclusion both single and multiple sessions of mobilization and/or manipulation ranging from 3 to 11 weeks showed no benefit in pain relief when compared to placebo, control groups, or other treatments for acute/subacute/chronic MND with or without headache. There was however strong evidence of benefit for pain reduction and functional improvement which favored multimodal care over no care at all. The multimodal care of mobilization and/or manipulation plus exercise were the common elements of treatment; however, there was moderate evidence of no difference in effect when compared to various other treatments.

The effect of electrotherapy for MND review was done in 2005.[2] The conclusions for this review were that the published studies on electrotherapy for MND were of low quality, underpowered, paucity of literature, and heterogeneity of treatment subtypes. There was limited evidence of benefit using either low or high frequency pulsed electromagnetic field except for immediate posttreatment pain relief only for chronic MND, or acute whiplash disorder (WD). There was lacking, limited, or conflicting evidence for the use of direct or pulsed Galvanic current, Iontophoresis, TENS, EMS, or permanent magnets. Therefore, no definitive conclusions could be made for using electrotherapy as a treatment for MND.

Thirty one trials meeting the selection criteria were reviewed on the use of exercise for MND in 2005.[3] There is limited evidence of benefit that active range of motion reduced pain in acute MND or WD. There was moderate evidence that neck stretching and strengthening exercises reduced pain, increased both function and perceived effect for the long- and short-term management of chronic neck disorders with headache. The stretching and strengthening program was focused on the cervical, shoulder/thoracic regions with no difference found between different exercise approaches. Moderate evidence was found for the addition of eye fixation or proprioception exercises added to a complete program for short-term MND or in the long-term treatment of WD. There was limited evidence that a home mobilization and physical modality program was more effective for pain relief over a program of rest than gradual mobilization. Again, the strongest evidence for pain reduction, improved function, and global perceived effect in the long and short term favored the multimodal approach of exercise combined with mobilization and/or manipulation.

The use of massage for MND was recently analyzed in 2006[4] even though the methodological quality was low for 12 of the 19 studies. Neither descriptions of the massage nor qualifications of the massage professionals were identified. Fourteen trials used massage in a multimodal treatment plan, but the contribution

of massage could not be determined making the benefits of massage in a multimodal treatment plan unclear. There were no recommendations for the use of massage in MND due to inconsistent results. Adding to these findings, according to Reuters news media, the January 2007 issue of the *Journal of Rheumatology*[5] reported that a sleep pillow plus exercise was more effective in reducing chronic neck pain than (1) massage, and hot or cold packs (2) massage, and hot or cold packs plus exercise, or (3) massage, and hot or cold packs plus a neck supporting pillow.

COMMENTS

All of the reviewers have added the time worn admonishment that further research needs to be conducted in all areas that were studied. The bottom line for the management of a person with chronic MND, who has seen 2 or 3 other physicians as well as 2 or 3 other physical therapists, is to thoroughly evaluate the patient and determine what physiological change we want to accomplish. We then can choose multimodal and complimentary methods of care that will accomplish our goals even though there is a lack of evidence for any one type of treatment at the present time.

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COMBINED SECTIONS MEETING MINUTES PAIN SIG FEB 16, 2007

The Pain SIG Business Meeting was called to order at 5:00 by Joe Kleinkort, the outgoing President. Present at the meeting were the newly elected officers, President, John Garzione; Vice President, Marie Hoeger Bement; Treasurer, Laura Frey Law; and Secretary, Anne Ingard.

Joe Kleinkort presented an award of appreciation to John Garzione for his service as Vice President of the Pain SIG 2001-2007.

Joe Kleinkort thanked Marie Hoeger Bement for her work as Program Chair for the Headaches and Cervical Spine course taught at CSM 2007 by Marion Brame.

Joe discussed the duties of each officer and all officers introduced themselves.

John discussed some of the issues that were discussed at the recent Strategic Planning Meeting at the Orthopedic Section headquarters in LaCrosse, Wisconsin. One of the topics discussed was whether or not the SIGs should be phased out, or restructuring of the SIGs to become educational interest groups.

John informed the Pain SIG that our group should contribute one article to every issue of *Orthopaedic Physical Therapy Practice* which is published quarterly. Greg Dedrick, an attendee at the meeting, and an assistant professor in the doctoral of science program at Texas Tech offered some help with these articles.

John would like to use blast email communication via the Orthopedic Section office to encourage interest in the Pain SIG.

The meeting was adjourned at 6:00 PM.

Respectfully submitted,
Anne Ingard, PT

performingarts

SPECIAL INTEREST GROUP

DEAR PASIG MEMBERSHIP!

NEW COMMITTMENTS!

The year of 2007 has begun with great promise and a renewal of commitments from the PASIG Executive Board and the Committee Chairs. CSM 2007 was a great success, and it was a wonderful opportunity for membership to enjoy outstanding programming and a chance to meet and greet at our annual business meeting and reception. The program covered the span from differential diagnosis to rehabilitation of the hip and included evidence-based presentations with excellent case studies and live demonstrations. The speakers were very well prepared and deserve our gratitude for a job well done. Our annual business meeting followed the programming and the minutes are recorded in this edition of the *OPTP.* Congratulations go out to our winners of the Student Scholarship Program: Christine Berglund and Laura Philipps. Unfortunately, they were unable to attend CSM due to the weather, but their contribution to the PASIG and the current body of knowledge is invaluable.

The Executive Board and Committee Chairs/members have been very busy working on many projects that everyone at CSM 2006 deemed as a priority. The action plan developed by the board with membership input is undergoing revision to reflect the accomplishments of 2006 and continue with the goals for the 3 to 5 year plan. The revised action plan will be posted on the website and will be available for membership response, questions, and comments. This action plan is designed to be dynamic and requires the input of all membership to reflect the various needs of our SIG.

I would like to say goodbye to our outgoing Secretary, Julie O'Connell. She has served the PASIG tirelessly in her accurate account of our Board and Business Meetings, survey compilations, and preparation of all of the *OPTP* newsletters for the past 3 years. She has also served as chair of the Membership Committee as well. Thank you Julie! I would like to also welcome the return of Tara Jo Manal as the Vice President of the PASIG and the Chair of the Education Committee. She has provided the leadership to accomplish outstanding programming over the last 3 years, and we can all look forward to the next 3 years with great anticipation. Karen Hamill also joins the Board as the new Secretary, Stephania Bell has moved into the role as the Nominating Committee Chair, and Heather Southwick will be on the nominating committee as the newest member. The Research Committee will continue under the leadership of Shaw Bronner and the Practice Committee will also continue to be chaired by Erica Baum Coffey. Leigh Roberts will be serving as the Treasurer and the Chair of the Student Scholarship Program. All of the committees need help and can use new and fresh ideas from the membership. The contact information for all of the chairs and executive board is listed in this newsletter and is also located on the website at www.orthopt.org.

Thank-you again to all whom make this organization so dynamic. Please make your new commitment to the PASIG and join us in making an even better PASIG in 2007. Caring for the Arts brings out the best in all of us!

Susan C. Clinton PT, MHS, OCS
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Minutes from Business Meeting 2007 PERFORMING ARTS SPECIAL INTEREST GROUP BOARD OF DIRECTORS MEETING MINUTES Combined Sections Meeting: Boston, MA 2007

Susan Clinton, President called a regular meeting of the PASIG Board of Directors of the Orthopedic Section, APTA to order at 5:15 pm EST on Friday February 16, 2007.

Present: Susan Clinton, President; Tara Jo Manal, Vice President; Julie O'Connell, past Secretary/current Membership Committee Chair, Karen Hamill, present Secretary; Shaw Bronner, Research Committee Chair; Erica Baum Coffey, Practice Committee Chair; Stephania Bell, Nominating Committee Chair; Sheyi Ojofeitimi and Heather Southwick Nominating Committee Members

Absent: Leigh Roberts

The business meeting agenda was approved as written.

The previous Board of Directors Meeting minutes of February 2006 CSM San Diego were reviewed. There was a motion to accept the meeting minutes as written by Marshall Hagins and seconded by Shaw Bronner. A vote was taken and the minutes were approved.

PRESIDENTS REPORT—Susan Clinton
Susan Clinton reported an overview of PASIG business since CSM 2006 and how she has returned to the role of President after a short absence due to hurricane Katrina.
Susan Clinton gave an update of PASIG Action Plans and Objectives with handouts.
Susan Clinton gave recognition of service awards to outgoing members with plaque presentations to:

Tara Jo Manal—immediate past Vice President
Julie O'Connell—immediate past Secretary

VICE PRESIDENTS REPORT—Tara Jo Manal

Tara Jo Manal reported on the Emergency Response Course held in Delaware in September. It was a 3-day course with 16 participants.
Tara Jo reported she felt it was successful for a first try however wondered if in the long term: is it feasible and financially sound? And is there a way to make it easier and less expensive? Another course will be held sometime in the future however no current plans.
Marshall Hagins questioned if we could use IADMS mailing list due to their huge response to their continuing education program at Harkness in January.
Ms. Manal responded that direct mailings are expensive ($400.00+) however she is open to trying more things to get more people to participate.
She would be open to possibly combining with Sports Section with perhaps a performing arts subgroup.
Ms. Manal is planning on using the Definition of Clinical Practice for Performing Arts Physical Therapy to plan programming for CSM 2008. She will be summarizing this document to make it user friendly when planning future programming.
Ms. Manal would like ideas for next year's CSM programming. Questions if we need to gear it towards musicians and/or dancers--possible cervico-thoracic topic for CSM 2008.
Ms. Manal is interested in helping others to develop a fellowship versus a residency program for the physical therapist for performing artists. Are there any interested parties? Please contact Tara Jo Manal at tarajo@udel.edu.

TREASURERS REPORT—Susan Clinton (in the absence of Treasurer-Leigh Roberts)
Ms. Clinton reported that PASIG's 2007 budget was approved 8/25/06.

TaraJo Manal donated $250 to encumbered funds to apply to student scholarship.

There were increases in the budget for conference calls and awards for outgoing officers. Speaker fees and travel to CSM remained the same.

Motion: Lisa Shoaf; Second: Tara Jo Manal to accept the 2007 budget as it stands. A vote was taken and the budget was approved.

STUDENT SCHOLARSHIP REPORT—Shaw Bronner-Research Committee Chair (in the absence of Leigh Roberts)
Ms. Bronner stated that PASIG website contains PT practices that have student affiliates with a performing arts specialty. She reports that is always the need to continue increasing student affiliations. There is also a need to increase awareness of scholarship to the schools. Schools were emailed and faxed information on the student scholarship, however, there is uncertainty to whether the information is getting to the students.

There was one abstract that was submitted and presented as a platform; however due to weather the students were not able to attend CSM. The winners of this year's award are the following: Christine Berglund, DPT and Laura Philipps, MPT for a case study: Flexor Hallucis Longus Tendinitis in a Dancer.

Action Plan: Continue to develop school affiliations
Increase student representation at Ortho Section
Goals: Increase student submission for scholarships
Increase mentorship program participation

RESEARCH COMMITTEE—Shaw Bronner
Ms Bronner reported that citation blasts are successful and 17 have been submitted since 2006. The March citation blast went out to all Ortho Members. She recognized those people who developed special interest Citation Blasts including Brent Anderson, Sheyi Ojofeitimi, Jennifer Gamboa, Jeff Stenback, and Yuriko Nabeta.

She stated that we currently have 14 PA clinical affiliations listed on the PASIG website with mentors available to support student researchers.

GOALS:
1. Increase CSM abstract submission.
   There was an increase in submission to 4 in 2006, and 6 in 2007.
   Ms. Bronner is encouraging others to step up and present case studies for platform presentations. There are many outlets available for publication: *JOSPT, OPTP*, *Journal of Dance Medicine and Science.*
2. Improve communication within the committee and disseminate information to the membership.
3. Encourage members to participate on research committee to promote research in the form of case studies, platform and poster presentations.

PRACTICE COMMITTEE—Erica Baum Coffey
Action Plans:
1. A pilot dance screen was performed under the Dancer's Task Force as a part of Dance USA with Alvin Ailey, Boston Ballet, and Pittsburgh Ballet Theater. Post-hire, preseason screening exams were performed on dancers from these companies. There is a need for improving the screening process as well as increasing the participation of companies performing the screen. There was discussion on this topic as to the purpose of the dance screens and whether they are being done to get a good medical history for the dancers and establishing a rapport with the dancers or if the screens were being used to be a predictor of future injury. This discussion will develop as the data is reviewed.
2. Ms Coffey continues to explore developing a musician screening/assessment tools. A question was put forth to find PTs who are interested in working with musicians.

GOALS:
1. Provide a central clearing house for entry-level mentorship programs.
2. Increase collaboration with Dance USA, IADMS, PAMA, USA Gymnastics, and US FSA and musician groups.

NOMINATING COMMITTEE—Karen Hamill
Elections in November: Ms. Manal was re-elected to VP
Ms Hamill was elected to Secretary
Ms. Southwick was elected to Nominating Committee
Stephania Bell is taking over as Nominating Committee Chair

Call for Nominations for 2008
President
Treasurer
Nominating Committee Member
A handout for positions and responsibilities was made available to interested parties.

MEMBERSHIP COMMITTEE—Julie O'Connell
At CSM 2006, 30 new members were gained with 3 of those members actively participating in PASIG opportunities.
Ms. O'Connell will be updating website with regards to: mentors and education institutions with a performing artists specialty.

Old Business: none

New Business
Motion 1: Shaw Bronner for Jennifer Gamboa discussed the idea of submitting the citation blast to *Journal of Dance Medicine and Science* for publication.
Ms. Bronner will contact Ruth Solomon (the Editor) and the publisher to see if this is something that they are interested in pursuing.

Motion 2: Ms. Manal attended a meeting in October for strategic planning for Special Interest Groups. A topic that was discussed was for the Ortho Section to begin reducing some responsibilities that are redundant and cumbersome for SIG—ie, new member packets, speaker budgets, no mandatory pages for *OPTP*.

The meeting adjourned at 6:25 pm

Minutes submitted by Karen Hamill, Secretary

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HELLO!

I'm happy to report that the APT-SIG is off to an exciting start in 2007 after an incredibly successful session of educational programming at CSM in Boston. We have Gina Epifano, our Education Chairperson, to thank for organizing and running the show! During our Thursday afternoon session, Laurie Edge-Hughes, BScPT, CAFCI, CCRT, M AnimSt (Animal Physiotherapy) spoke on the canine sacroiliac joint, while Sherman Canapp, DVM, DACVS presented a lecture on injuries in the athletic dog. The grand finale of the session was a series of demonstrations of basic canine rehabilitation techniques by our own SIG officers. This is the first, and hopefully not the last, time that there were live dogs involved in any APTA programming. We are indebted to the kind volunteers and eager pups from Caring Canines Visiting Therapy Dogs, Inc., a Delta Society organization, for acting as our gracious "demo dogs."

We're also excited to be pushing forward with our Practice Analysis. We're just completing our initial interview process of selected animal rehabilitation practitioners from across the US. Our next step is to compose a survey which will eventually be distributed to our membership. Our goal in performing this Practice Analysis is to define the role of the physical therapy professional in the field of animal rehabilitation and physical therapy. We're certain that the eventual resulting document will assist our SIG in our mission of defining, advancing, and promoting "the role of the physical therapy profession in the field of animal rehabilitation through education, collaboration, communication, advocacy, and ethical practice."

We're continuing to focus on increasing and improving communication with our members. We hope that you might continue to give us feedback regarding how we're doing with this task (among others). You'll find that we're doing more member email "blasts" with up-to-date news and happenings. Be sure that you're on our email list to receive these blasts.

In close, I'd like to thank our outgoing Vice President, Steve Strunk and Education Chairperson, Gina Epifano for years of service that went above and beyond our expectations. We're certain that we've not heard the last from either of these leaders and we look forward to continuing to work with both Steve and Gina in the near future as committee members and members of our State Liaison Network. Thanks again!

Best wishes to all of you for a beautiful day!
Till next time,
Amie Lamoreaux Hesbach

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- Vestibular Rehabilitation, Dizziness, Balance, and Associated Issues in Physical Therapy (May–October)
- Basic Science for Canine Physical Therapists, 2nd edition (October–December) *(This is a 3-monograph course. Registration fees: $80 Orthopaedic Section Members, $155 APTA Members, $205 Non-APTA Members. Fees include shipping and handling.) (15 contact hours)*
- Basic Science for Equine Physical Therapists, 2nd edition (October–December) *(This is a 3-monograph course. Registration fees: $80 Orthopaedic Section Members, $155 APTA Members, $205 Non-APTA Members. Fees include shipping and handling.) (15 contact hours)*

CURRENT COURSES AVAILABLE

- Current Concepts of Orthopaedic Physical Therapy, 2nd edition *(This is a 12-monograph course. Registration fees: $240 Orthopaedic Section Members, $490 Non-Orthopaedic Section Members. Fees include shipping and handling.) (84 contact hours)*
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