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ORTHOPAEDIC PHYSICAL THERAPY PRACTICE

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- advancement of education, and
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Editor's Corner

Clinical Decision-Making: The Heart and Soul of Effective Patient Care

In the news recently there has been much review of some very important decisions that have effected our country's involvement in events overseas. Much of the debate stems from the validity of information and its impact on future decision making. While the debate on this front continues, one does not have to look far professionally to see the impact of proper decision-making and its role in optimizing patient care.

Simply stated, clinical decision making is the process by which we determine who needs what, when. The clinicians' ability to collect, organize, and integrate the data directly effects the subsequent actions of care. The topic of clinical decision making and its role in the development of expert clinical practice has been the subject of many books and papers. [1-3]

Experienced therapists and clinical educators can often see distinct differences in the way an 'expert' clinician and a novice clinician assess a clinical problem and attempt to propose solutions. Jensen and coauthors have compiled an insightful perspective on the topic of expertise in physical therapy.[1] The authors cite knowledge, clinical reasoning and judgment, reflection and skill acquisition as traits that comprise the essential components of developing expertise. In the context of preparing future clinicians for today's practice emphasis is not only placed on the development of an expanded didactic knowledge through the upgrade to entry level clinical doctorate programs, but also attaining greater mentoring through longer clinical affiliations and also a strong push toward developing skills needed to execute evidence based practice through critical review of the literature. Despite these proposed changes one still has to ask, "What is the most effective way to teach good clinical decision making?"

In a recent visit to my newly born daughter's pediatrician, I overheard a discussion between the pediatrician and two students who were interning at his practice. The students queried the pediatrician on how his latest clinical decisions on treating a previous patient measured up against some of the algorithms they had learned in school. His reply was all too familiar to what I have heard or have relayed to past students. He noted that algorithms and critical pathways are fine for understanding clinical processes but you still have to include unique aspects of the patient and also integrate personal clinical experience to come up with the most appropriate and individualized intervention strategy. His utilization of experience constituted a vital supplement to his general clinical knowledge to arrive at the best approach to care.

This simple example highlights the healthy synergy that can exist between the didactic teachings in a curriculum and the mentoring gained through clinical affiliations. Both approaches allow for full development of the student experience and can lead to an elevated standard of practice.

Traditionally, clinical decisions have followed logical 'if… then…' rules (eg, if a patient shows this sign or symptom, then implement this clinical test or treatment). Formalizing the decision-making process enables clinicians to analyze the assumptions and uncertainties underlying decisions. However there is more to the process of clinical decision making. Sackett and his coauthors in their widely cited book on evidence based medicine include best evidence through literature appraisal, clinical expertise, and patient values as important factors in clinical decision making and delivering evidence-based care.[2] These authors emphasize that the gathering of evidence through literature appraisal by itself, doesn't make a decision for you, but it helps support the overall patient care process. The inclusion of a patient's values, preferences, and concerns cannot be ignored in shaping clinical decisions. In the end result it is the assimilation of evidence, patient circumstances, and patient wishes or desires that culminates in an effective decision making process. Each of these attributes can be appreciated and improved upon in the clinical environment as students and current therapists work with their clinical mentors.

Like most educators I often engage in conducting case based competencies to assess student performance. This is probably the most intriguing part of my academic duties since I get a chance to truly ask the student "why" they made the decisions they did as opposed to just grading "what" skill was performed. To get to the root of decision making requires a "peeling of the onion" through this type of inquiry. I am most interested in this thought process since this is where decision making begins and reveals the logic behind the action. Allowing the student to trace back or reflect on their decision making 'footsteps' often proves enlightening for both student and examiner. Jensen and co-authors discuss reflection as an essential aspect of developing clinical expertise. The method of reflection is often used by clinicians and academicians alike. The end result is effective mentoring and role modeling for the student. So how can clinicians continue to develop through clinical reasoning abilities? Some ways to foster improvement can be made by participating in the following:

- **Staying Current:** Broadening our knowledge using the principles of evidence-based practice can expedite this process and allow the clinician to effectively sift through the most pertinent information to keep abreast of advances in the profession.
- **Peer Review Activities:** Peer review of our performance by colleagues generates debate, critical inquiry, and the formulation of new ideas about optimizing care.
- **Varied Clinical Experiences:** The more we experience the more perspective we gain on problem solving. Experience increases the cognitive resources available for interpretation of data resulting in more accurate decision making.

Several articles in this issue bring the importance of clinical decision-making to the forefront. Each of the authors handles the process slightly differently but I think you will appreciate their perspectives. If you have not already done

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President's Message

Physician Owned Physical Therapy Practices, POPTS for short, are again making headlines in physical therapy practice. In my home state of Missouri, POPTS are against the law. However, as money increasingly becomes tighter in health care, many physicians are looking for new and innovative methods to improve their lost cash flow. It's like in the book, *Who Moved My Cheese* orthopaedic physicians are looking for new cheese at our expense! Missouri is but one of a small number of states that have a strong POPTS law in place, or so we thought. Just last year a new Physical Therapy Company was formed by a group of orthopaedic surgeons and other businessmen that was filed as a non-for-profit Missouri corporation. In our Missouri POPTS law, we had a small 'loophole' in the state statute. Unfortunately the attorneys for a group of orthopaedic surgeons discovered this 'loophole.' The 'loophole' was that a Missouri POPTS could exist if the physical therapy practice was a non-for-profit entity. This discovery resulted in the beginning of a new outpatient physical therapy clinic within a major Orthopaedic Surgeons' group practice. How you may wonder is this practice considered a non-for-profit? I, along with many others, wonder the same thing. Until we get the numbers we do not know how this non-for-profit is functioning in this capacity and therefore a legal entity. However, what we do know is that the physical therapists and physical therapists assistants that work there have been offered handsome salaries. It will be interesting to see the salaries of the principals.

So why are POPTS so bad for physical therapy? I have a friend who worked at a POPTS well over 20 years ago. The practice treated orthopaedic and sports injuries. On staff were 5 orthopaedic surgeons, a neurologist, 1 family practice physician, 4 athletic trainers, 2 nurses, and 3 physical therapists. The practice included radiology, pharmacy, lab, everything, one stop shopping. The practice was a kind of Walmart that everyone seems to love! It was nice for the patient, they see the surgeon, get radiographs if needed, or see a family doc, get medication, and see a physical therapist—all in one day. So what was wrong with this? Right now many physical therapists work in this sort of environment. The learning experience was excellent with an integration of services that made sense. Radiographs were interpreted and readily available for view.The physicians could be easily consulted regarding protocol after surgery without having to fax, call, or wait for a seemingly forever amount of time before a nurse, a physician assistant, or sometimes a secretary with no medical training got back with an answer to your often simple question. He used to boast how good his salary was, much better than a hospital or other practices at the time; plus, my friend had the freedom to treat the way he wanted. Why would he want to leave? At first he had complete control over his charges; as time went on this was slowly changed. Pressure mounted to charge more, sometimes to see patients more, or see patients that were not a candidate for physical therapy. Other times athletic trainers were asked to see workers compensation patients with complex low back pain or patients with symptom magnification problems. Most athletic trainers are usually not educated to treat these sorts of complex patients, but they did. Soon he started to realize some of the problems with POPTS. POPTS was a business, first and foremost, money not patients come first. The clinic that he once thought was utopia had some major cracks forming in the wall.

It has been 18 years since I have owned my own private outpatient physical therapy practice. I currently see about 18 patients a day. I have grown little expanding to 2 clinics now. The small community where I work does not have any POPTS clinics. Physical therapy does not reimburse therapists like it did 10 years ago, but I am still making it. I have more good times than bad times, however, if any POPTS clinics proliferate and move into my area I know that I am probably out of a job. If a POPTS comes to my area, this closed chain system will undoubtedly remain the same. Why or how could I expect a referral from a physician owning a POPTS no matter what my qualifications are? From previous experience, I realize I won't get any referrals. Others may say I am a qualified physical therapist, why can't I work where I want; this is a free country. Well, the United States may be free but as long as the physicians control the referrals, physical therapists are not free. Those physical therapists who are working in a POPTS violate my freedom by restricting patient access. Patients must and should have the freedom of choice to go to a therapist they choose.The combination of denied direct patient access and POPTS creates an unfair business practice that I cannot fairly compete against. In business everyone wants a monopoly. A monopoly is what a POPTS really is. In a monopoly business is controlled by one (mono), some body is left out. It's great if you're in the monopoly but what if you are left out?

The POPTS owners have argued that physical therapists or corporations who own physical therapy practices are really no different than POPTS. Is this true? Is it all just about control and money? What is the difference between a major corporation and a large physical therapy practice that is owned by just a few therapists that employ many physical therapists? Some POPTS argue the only difference is where the money goes. If the physician sees the patient first, why don't they deserve a 'share' of the wealth for referral? Many businesses work that way. Furthermore, isn't it the physician's patient anyway? Who owns the patient? Today more than ever I believe we need a major paradigm shift, we must pass the Rubicon, and allow physical therapists to take our profession back.The majority of physical therapy practices do not follow the normal model of most other professional groups. Consider the profession of attorneys, architects, engineers, or certified public accountants, most work within group practices. How many doctors or attorneys are hired to work for someone else? Most do not! How many doctors or lawyers are employees? Very few! Most work as professionals in a *professional* practice. In a professional practice there is usually a hierarchical system where they may have a founding partner, senior partner(s), junior partner(s), and then associates. Professionals move up the professional ladder according to *merit and hard work*. Skill, education, and experience are the measures of a therapist's success, not just

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Current Concepts: Rehabilitation of Patients with Shoulder Impingement and Tight Posterior Capsule

Chris G. d'Hespeel, PT

FUNCTIONAL ANATOMY OF THE POSTERIOR SHOULDER

The glenohumeral (GH) joint is the most mobile in the entire body. Movement of the shoulder requires a delicate synchronized action of all structures involved. Muscle balance, neuromuscular control,[1] and joint congruency play a vital role in coordinating this mobility with stability. The labrum deepens the glenoid socket to receive the large convex humeral head which is 3 to 4 times larger than the glenoid fossa radius.[2] As a result, joint stability is enhanced despite the lack of stabilizing bony contours. The vacuum effect created by the negative intra-articular pressure also assists in keeping the joint stable.[3] Still, because of its anatomical architecture, the joint is intrinsically unstable and relies heavily on the static (capsule and ligaments) and dynamic (contractile structures) stabilizers. The soft tissue envelope covering the glenohumeral (GH) joint, consisting of both static and dynamic structures, provides primary stability to the joint.

The structures of the *posterior* aspect of the shoulder include muscles, ligaments, nerves, and soft tissues.[4] The posterior capsule is thin and has no capsular ligaments except for the posterior band of the inferior GH ligament.[1] The role of the capsuloligamentous complex in stabilizing the GH joint is complex and varies with both shoulder position and the direction of the translation force.[1] The posterior capsule is the main restraint against posterior translation of the humerus on the glenoid fossa with the arm below 90° of abduction (ABD).[5] With the arm at 90° of ABD the inferior glenohumeral ligament (IGHL) and the posteroinferior capsule become the main restraint. The posterior band of the IGHL resists inferior translation when the arm is at 90° of ABD. The ligament also shows significant strain with the arm elevated and internally rotated in the sagittal plane.[6]

Primary and Secondary Impingement

Over the past several years shoulder impingement has received significant attention.[7-11] *Primary* impingement refers to the intrinsic degenerative process in the structures occupying the subacromial space due to micro trauma and/or anatomic variations of the acromion.[7] It has been the author's experience that patients with primary impingement are typically over the age of 40 and present with limited horizontal adduction (as compared to the uninvolved site) and limited IR (< 50°). The general clinical picture is one of *hypo*-mobility as opposed to *hyper*-mobility. *Secondary* impingement is a result of subtle GH instability often times seen in athletes who participate in overhead sports.[9,12-16] These athletes typically present with limited internal rotation (IR), excessive external rotation (ER), and antero-superior humeral head migration.[7] Posterior capsule tightness has been suggested as a contributing factor to secondary impingement in the thrower.[17] Capsular tightness in relation to primary impingement however has received much less attention in the rehabilitation literature.

Role of the Posterior Capsule and Its Contribution to Primary Impingement

Harryman and colleagues[18] analyzed the biomechanics of the glenohumeral (GH) joint in vitro. They theorized that a tight shoulder capsule will force the humeral head to translate in a direction opposite to the tight tissue constraint. This is referred to as the *capsular constraint mechanism.* They demonstrated in vitro that tightening of the posterior capsule increases the anterior and superior translation of the humeral head during forward flexion. Wilk et al[17] introduced the term 'asymmetrical capsular tightness' describing a situation in which one portion of the capsule is tighter than the other portions, inhibiting translation in the direction of the tightness. Tightness of the inferior and posteroinferior capsule may inhibit the humeral head from gliding inferiorly during overhead movements.[8] Tyler and associates[4] suggest that a tight posterior capsule may cause antero-superior migration of the humeral head during forward elevation, thus contributing to impingement. Although the correlation between the GH capsulo-ligamentous complex and its effect on GH range of motion (ROM) has been addressed in the literature,[1,19-21] one may question the exclusive role of the posterior capsule in causing excessive antero-superior migration of the humeral head. One may argue that the posterior contractile structures (eg, infraspinatus) may be tight as well and therefore be responsible for the lack of posterior translation, which in turn may cause impingement. Harryman and coauthors[18] state however, that GH translation during active and passive movement is primarily controlled by *capsular* tension. This is confirmed by Howell et al[21] who downplay the role of the contractile structures suggesting that the capsule (and/or the articular congruencies), not the muscular envelope is responsible for the mechanism that generates the translation. It also has been suggested that the surgical procedure of choice in patients with tight posterior shoulder structures is selective release of the posterior capsule and not of the posterior contractile structures.[19,22] This author is unaware of soft tissue cutting studies (in vitro or in vivo) of the posterior musculotendinous structures of the shoulder, or literature that supports the claim that such a procedure would be an appropriate intervention to address limitations of shoulder ROM and/or primary shoulder impingement.

Surgical studies have demonstrated a relationship between the posterior shoulder capsule and shoulder ROM, showing an increase in IR when posterior portions of the capsule are released.[19] Bennett[22] showed a significant increase in IR after posterior capsule release, regardless of the etiology of the limited passive ROM. Warner and colleagues[23] evaluated 18 patients following shoulder surgery, with persistent limited ROM despite conservative treatment. Those patients with only limited IR were selected for arthroscopic release of the posterior capsule. The posterior capsule was found to be thickened and contracted. The surgical release resulted in significant gains in IR.

Based on these findings, the author believes that GH translation is predominantly controlled by the GH capsulo-liga-

mentous complex in which the posterior part of the capsule and the posterior band of the IGHL play an important role in controlling shoulder IR. Tightness in those posterior structures may contribute to limited IR and primary impingement.

How to Assess Posterior Capsule Tightness

The stability of a joint is related to the integrity of the capsule. The amount of translation movement of the humeral head in relation to the glenoid rim, which is controlled predominantly by the capsule, is considered a qualified measure of joint stability.This is typically done using a manual force displacement technique, such as for example the anterior-posterior drawer test.[24] Unfortunately clinical research has questioned the validity as well as reliability of those manual techniques.[8,25]

Additionally the tests are designed to determine *hyper*-mobility as opposed to *hypo*-mobility of the joint capsule. Consequently those techniques lack clinical relevancy in the specific assessment of posterior capsule tightness. Warner et al[26] were unable to demonstrate posterior capsule tightness in patients with shoulder impingement using the drawer test. Others have used instrumentation such as force applicators with load cells[27] and the KT 1000;[28] however, these devices are unavailable in the common clinic. Additionally, because the shoulder capsule is a continuous structure, a posterior humeral translation maneuver affects both the anterior and posterior restraints thus making a selective appreciation of the posterior structures arguable.

Putting the anterior shoulder structures on slack to evaluate potential restrictions of the posterior capsule can be accomplished with horizontal (cross-chest) adduction (ADD). Such a maneuver, however, does not eliminate other posterior shoulder structures (nerve, fascia, muscle) from being stretched. Three authors have discussed this method. Warner et al[26] describe a goniometric technique with the patient in supine, shoulder at 90° flexion (0° ADD), moving the arm into cross-chest ADD until the scapula lifts off the table.This would indicate the end of glenohumeral motion and the beginning of the scapulothoracic contribution. Pappas and associates[29] use the same goniometric technique but manually stabilize the scapula to palpate for end range of GH ADD. Passive horizontal ADD of less than 45° indicates decreased flexibility in posterior structures. Neither study offers an in depth description of their methods or furnish data to support the consistency of their measurements.

Tyler et al[4] recently proposed an innovative cross-chest ADD technique in side lying. Distance is measured in cm from the medial humeral epicondyle to the plinth using a carpenter's square. Intratester data were gathered by 1 of 2 testers on dominant and nondominant shoulders of 21 subjects without impairments, on 5 consecutive days with reported ICC .92 (dominant) and .95 (nondominant). Intertester reliability was .80. For construct validity, they measured 22 male collegiate baseball pitchers because this population is speculated to have loss of IR in their throwing arm related to adaptive tightness of posterior shoulder structures. The results indicated that the baseball pitchers had significantly less IR and increased posterior capsule tightness as compared to the subjects without impairment.This is the first study that measures the relationship between IR and posterior shoulder tightness found in pitchers.

The procedure outlined by Tyler and associates[4] is well described and appears adequate for comparison of repeated measures for the same subject and performed by the same clinician. The Tyler technique controls humeral rotation and depends on palpation skills to appreciate scapular movement. The side lying position may cause variability in spinal rotation. The carpenter's T square may have less error with ease of placement compared to goniometric measurement, but it is cumbersome and requires 2 testers.The data can only be used for intra-patient interpretation because the length of the humerus and the width of the subject's shoulder girdle are recognized by the authors as potential sources of inter-subject variability. The Tyler technique offers a valid and reliable assessment tool of posterior capsule tightness. It is unclear as to how much training of the testers was required in order to get valid and reliable test results. Replication studies are needed to confirm reliability and validity results.

Treatment Concepts in Primary Impingement

Stretching the posterior capsule may inhibit anterosuperior migration of the humeral head and thus could remedy impingement. Specific techniques will be discussed in the next segment. Other components of the treatment plan include manual acromiohumeral decompression techniques[30] (eg, caudal and anterio-posterior glides) and strengthening of the humeral depressors (Table 1).

Table 1. Treatment Concepts in Primary Shoulder Impingement

No overhead activities
Strengthening humeral depressors
Manual acromio-humeral decompression
Posterior capsule stretch
Internal rotation stretch

STRENGTHENING

Infraspinatus, teres minor, and subscapularis muscles are the primary depressors of the humeral head during shoulder elevation.[31] Cephalic humeral head translation during ABD has been documented in vitro and in vivo.[16,32] Therefore caution is recommended with ABD exercises. Selective strengthening of the inferior rotator cuff muscles may enhance their ability to resist superior migration of the humeral head directed by the deltoid.[33]

Strengthening exercises for internal and external rotators, should be done with the arm slightly abducted because of the '*wringing out'* phenomenon of the supraspinatus described in vitro by Rathbun and Macnab.[34] They observed improved vascularity in the tendon when the arm was kept in a slightly abducted position as opposed to in a dependent (adducted) position.

It is also important that all strengthening exercises are executed in positions that eliminate or minimize impingement. The impingement process is self-perpetuating in which each elevation may cause the swollen soft tissue structures to be compromised in the subacromial space thus causing more irritation. Therefore, early in treatment, patients should refrain from overhead activities, including those activities that are pain free, while ADLs ideally are restricted to waist level for the involved extremity (keep the elbow down).

Additionally, altered scapulothoracic kinematics should be considered in the treatment plan as well.This highlights the underappreciated role of scapular control in patients afflicted with impingement.

Lukasiewicz and coauthors[35] found less posterior tilting and excessive superior translation of the scapula during scapular plane elevation in patients with impingement. The authors suggest stretching the pectoralis minor and strengthening the serratus anterior. Others have found decreased scapular upwards rotation in the throwing athlete.[1,36,37]

Isolated Posterior Capsule Stretching Technique

Commonly prescribed treatment for shoulder impingement includes techniques to stretch the posterior shoulder structures.[31,38] Posterior shoulder tightness is qualified by the ability to bring the involved extremity all the way across the chest in comparison to the uninvolved side (Figure 1). The goal of such a maneuver is not to increase horizontal ADD but rather to improve the flexibility of the posterior capsule. This technique does *not* isolate the scapulo-humeral posterior structures given the excessive scapulothoracic substitution during the stretch. Scapular winging confirms such substitution. Flexibility gains in horizontal adduction may well be the result of lengthening scapulothoracic structures such as the rhomboids, thereby defeating the purpose of the maneuver.

This author has developed an *isolated posterior capsule stretch* (IPCS) technique that attempts to control scapulothoracic substitution. Unlike most mobilization techniques the IPCS stabilizes not the proximal but the distal segment, and mobilizes the proximal one.

METHOD

Patient is in side lying with the affected shoulder towards the table and arm in 90° of forward flexion. Patient is asked to roll forwards to about a 45 degree angle. At this point scapular winging should be noticeable (Figure 2). The therapist stands behind the patient and applies pressure with the palm of the hand onto the medial border of the scapula (Figure 3). The scapula is then depressed down towards the posterior thorax, reversing scapular winging.

The amount of scapular pressure is gauged by the therapist's position in relation to the patient. The amount of forward roll and the degree of forward flexion of the involved extremity are important variables in adjusting the technique. To self stretch the posterior scapulohumeral

Figure 1. Common crossed-arm adduction technique for posterior capsule stretch.

structures the author proposes the patient lean against the wall with the medial scapular border. The body weight of the patient will counteract scapulothoracic substitution by pressing the scapula into the thorax while bringing the arm across the chest (Figure 4).

Internal Rotation Stretch

The standard IR self stretch technique,[38] bringing the hand behind the back, does not stabilize the scapula (Figure 5). Scapulothoracic substitution allows the maneuver to stretch the scapulothoracic soft tissue structures and does not selectively stretch the GH capsule. This can be controlled by placing the arm behind the back while leaning against the wall and pressing the medial border of the involved scapula into the wall (Figure 6).

For a hands-on stretching technique, a prone lying technique is proposed keeping the arm between 45° to 90° of ABD (depending on the amount of limited IR) with the elbow flexed 45° to 90°, fixated against the table. If IR is limited, scapular winging will be visible (Figure 7). With the elbow depressed into the table, the clinician applies pressure through the palm of the hand onto the medial border of the scapula (Figure 8). The pressure is directed towards the posterior thorax which reverses the winging. The technique can be progressed (or regressed) by increasing (or decreasing) the ABD angle, thus by sliding the elbow up (or down) along the table. Too much ABD will elevate the elbow off

Figure 2. Scapular winging with horizontal adduction in side lying.

Figure 3. Isolated posterior capsule stretch technique.

Figure 4. Modified isolated posterior capsule self stretch technique.

the table compromising the fixation. One can also reverse the fixation and mobilize the distal segment (pressing elbow towards the table) while stabilizing the proximal segment (scapula). Patients with significantly limited IR will often be unable to maintain that arm position in prone and will prefer to keep the elbow straighter in order to minimize the internal rotation maneuver. The supine technique is a wel-

Figure 5. Standard internal rotation self stretch technique.

Figure 6. Modified internal rotation self stretch technique.

Figure 7. Scapular winging with limited internal rotation.

Figure 8. Modified internal rotation stretch in prone.

come addition and variation in stretching IR; however, the prone technique allows for better fixation of the involved segments. Horizontal ADD techniques, as well as IR combined with ABD may be contraindicated if anterior compression pathology is suspected. Although all these techniques are directed to the capsule, restrictive muscle-tendon units may play a role.

CONCLUSION

Shoulder primary impingement is a prevalent pathology in the outpatient rehabilitation setting. Successful treatment is contingent upon a detailed, systematic evaluation of the involved shoulder structures. Joint geometry and contractile and noncontractile structures among others need to be considered as potential etiological factors in shoulder impingement. Research suggests that the humeral translation mechanism, which may contribute to impingement, is controlled predominantly by the capsulo-ligamentous complex as opposed to the posterior contractile structures.[18,21] In vitro research has demonstrated that tightening of the posterior part of the shoulder capsule causes the humeral head to translate anterior and superior with forward flexion.[18] Thus, a tight posterior capsule may inhibit postero-inferior translation of the humeral head. The resulting anterocephalic migration of the humeral head may cause or enhance impingement of the subacromial soft tissue structures. A patient with such pathology may present with limited IR. This relationship, between a tight posterior capsule and limited IR, is supported by surgical studies in which release of the posterior capsule resulted in restoring IR.[22,23] Others have found a relationship between a tight posterior capsule and limited IR in baseball pitchers.[4] Identifying and quantifying posterior capsule tightness remains a challenge for future research because IR alone does not identify a tight posterior capsule.

Limited cross-chest adduction may be another indicator of a tight posterior capsule as long as scapulothoracic substitution is controlled. The innovative sidelying technique described by Tyler and colleagues[4] attempts just that. It is the only test that provides us with reliable and valid test results. The assessment requires 2 testers and does not allow inter-patient comparison. Contingent upon appropriate skill level of the testers, clinicians should consider this test as part of any posterior capsule evaluation.

The treatment principles of primary impingement include decompressing the subacromial space, controlling inflammation, and limiting offending movements. Gliding techniques,[30] strengthening the humeral depressors, and patient education should be considered as part of the plan of care. Scapulothoracic kinematics also needs to be considered.[1,35-37]

When a tight posterior shoulder capsule is identified the IPCS provides appropriate scapulothoracic control and thus could be a more effective stretching technique as opposed to the common cross-chest ADD technique. This novel technique may also assist in *identifying* posterior capsule tightness because of the noticeable scapular winging.

Despite the attempt to control scapulothoracic substitution in evaluating (eg, Tyler technique) and stretching (IPCS) the posterior GH structures, validating the posterior capsule tightness remains challenging because of the inability to differentiate with certainty between the posterior capsule and other posterior scapulo-humeral soft tissue structures. However, this author is confident that tightness of the posterior shoulder structures in patients with primary impingement is likely related to a tight posterior shoulder capsule (including the posterior IGHL) rather than other posterior shoulder structures.

Further studies are required to firmly establish the reliability and validity of evaluation techniques for posterior capsule tightness and to assess the effectiveness of posterior capsule stretching techniques for treating patients with primary shoulder impingement.

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Dry Needling in Orthopaedic Physical Therapy Practice

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NOTE: Consistent with ethical guidelines, the author wishes to disclose that he is co-founder and co-program director of the Janet G. Travell, MD Seminar Series℠, the only US-based continuing education program that offers courses for physical therapists in the technique of dry needling. Readers, check with your own state practice acts on the use of this technique.

INTRODUCTION

Orthopaedic physical therapists employ a wide range of intervention strategies to reduce patients' pain and improve function. From time to time, new treatment approaches are being introduced to the field of physical therapy. The arrival of manual therapy in the United States is a good example. Although for several decades, manual physical therapy was already an essential part of the scope of orthopaedic physical therapy practice in Europe, New Zealand, and Australia, manual therapy did not make its debut in the United States until the 1960s.[1] Initially many US state boards of physical therapy opposed the use of manual therapy. In spite of the early resistance, manual physical therapy has become a mainstream treatment approach. Manual therapy techniques are now taught in academic programs and continuing education courses. During the past few years, physical therapists, the APTA, and the AAOMPT even have had to defend the right to practice manual therapy especially when challenged by the chiropractic community! A similar development is in progress with the relatively new technique of dry needling. While some physical therapy state boards have already decided that dry needling falls within the scope of physical therapy practice, others are still more hesitant. The goal of this paper is to introduce the American orthopaedic physical therapy community to the technique of dry needling.

DRY NEEDLING

Dry needling is commonly used by physical therapists around the world. For example, in Canada, many provinces allow physical therapists to use dry needling techniques. In Spain, several universities offer academic programs that include dry needling courses. The University of Castilla - La Mancha offers a postgraduate degree in conservative and invasive physical therapy. At the University of Valencia, dry needling is included in the curriculum of the master's degree program in manipulative physical therapy. In Switzerland, dry needling courses are offered via the accredited continuing education program of the 'Interessengemeinschaft für Manuelle Triggerpunkt Therapie' (Society for Manual Trigger Point Therapy). Physical therapists in the UK are increasingly being trained in joint injection techniques.[2]

In the United States, dry needling is not included in physical therapy educational curricula and relatively few physical therapists employ the technique. Dry needling is erroneously assumed to fall under the scopes of medical practice or oriental medicine and acupuncture. However, physical therapy state boards of Maryland, New Hampshire, New Mexico, and Virginia have already ruled that dry needling does fall within the scope of physical therapy in those states. The Tennessee Board of Occupational and Physical Therapy recently rejected dry needling by physical therapists. The general counsel of the Illinois Department of Regulation advised that dry needling would not fall within the scope of practice of physical therapy but should be covered by the board of acupuncture. In the mean time, physical therapists who are adequately trained in the technique of dry needling are successfully employing the technique with a wide variety of patients.

DRY NEEDLING TECHNIQUES

Several dry needling approaches have been developed based on different individual theories, insights, and hypotheses. The 3 main schools of dry needling are presented: the myofascial trigger point model, the radiculopathy model, and the spinal segmental sensitization model.

Myofascial Trigger Point Model

Dry needling is used primarily in the treatment of myofascial trigger points (MTrPs), defined as "hyperirritable spots in skeletal muscle associated with hypersensitive palpable nodules in a taut band."[3] The MTrPs are the hallmark characteristic of myofascial pain syndrome (MPS). A recent survey of physician members of the American Pain Society showed general agreement that MPS is a distinct syndrome.[4] Throughout the history of manual physical therapy, MPS and MTrPs have received little or no attention, although several studies have demonstrated that MTrPs are commonly seen in acute and chronic pain conditions, and in nearly all orthopaedic conditions.[5] Vecchiet and colleagues demonstrated that acute pain following exercise or sports participation is often due to acutely painful MTrPs. Myofascial trigger points are often responsible for complaints of pain in persons with hip osteoarthritis,[6] pain with cervical disc lesions,[7] pain with TMD,[8] pelvic pain,[9] headaches,[10] epicondylitis,[11] etc. Hendler and Kozikowski concluded that MPS is the most commonly missed diagnoses in chronic pain patients.[12] A brief review of the current knowledge of MTrPs and MPS is indicated to better understand the place of dry needling within orthopaedic physical therapy.

Already during the early 1940s, Dr. Janet Travell (1901-1997) realized the importance of MPS and MTrPs. Recent insights in the nature, etiology, and neurophysiology of MTrPs and their associated symptoms have propelled the interest in the diagnosis and treatment of persons with MPS worldwide. The mechanism that underlies the development of MTrPs is not known, but altered activity of the motor end plate, or neuromuscular junction, is most likely. Changes in acetylcholine receptor (AChR) activity, in the number of receptors, and changes in acetylcholinesterase (AChE) activity are consistent with known mechanisms of end plate function, and could explain the changes in end plate activity that occur in the MTrP. There is a marked increase in the frequency of miniature end plate potential activity at the point of maximum tenderness in the taut band in the human, and in the neuromuscular junction end plate zone of the taut band in the rabbit model and in humans.

Normally, ACh is broken down by AChE. Preliminary results of studies by Shah and associates at the National Institutes of Health indicate that a number

of biochemical alterations are commonly found at the active MTrP site using microdialysis sampling techniques.[13] Among the changes found are elevated bradykinin, substance P, and calcitonin gene-related peptide (CGRP) levels, and lowered pH when compared to inactive (asymptomatic) MTrPs and to normal controls.[13] The combination of increased levels of CGRP and lowered pH suggest that the milieu of a MTrP is too acidic for AChE to function efficiently. The possible implications for the development of MTrPs is outside the scope of this article and will be addressed in a future article.[14] The administration of botulinum toxin can block the release of ACh, and is therefore now widely used in the management of chronic and persistent MPS.

Abnormal end plate noise (EPN) associated with MTrPs can be visualized with electromyography using a monopolar teflon-coated needle electrode and a slow insertion technique.[15,16] Active MTrPs are spontaneously painful, refer pain to more distant locations, and cause muscle weakness, mechanical range of motion restrictions, and several autonomic phenomena. One of the unique features of MTrPs is the phenomenon of the local twitch response (LTR), which is an involuntary spinal cord reflex contraction of the contracted muscle fibers in a taut band following palpation or needling of the band or trigger point.[17] The LTR can be visualized with needle electromyography and ultrasonography.[18,19]

To make a diagnosis of MPS, the minimum essential features that need to be present are the taut band, an exquisitely tender spot in the taut band, and the patient's recognition of the pain complaint by pressure on the tender nodule.[20] Simons, Travell, and Simons add a painful limit to stretch range of motion as the fourth essential criterion.[3] Referred pain, the LTR, and the electromyographic demonstration of end plate noise are confirmatory observations and not essential for the clinical diagnosis.

From a biomechanical perspective, National Institutes of Health researchers Wang and Yu hypothesized that MTrPs are severely contracted sarcomeres whereby myosin filaments literally get stuck in titin gel at the Z-band of the sarcomere (Figures 1 and 2).[21] Titin is the largest known protein that connects the Z-band with myosin filaments within a sarcomere. Approximately 90% of titin consists of 244 repeating copies of fibronectin type III and immunoglobin domains, which may contribute to the sticky nature of titin once muscle fibers are contracted.

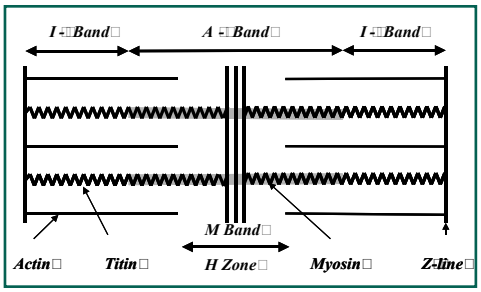

Figure 1. Schematic representation of a normal sarcomere.

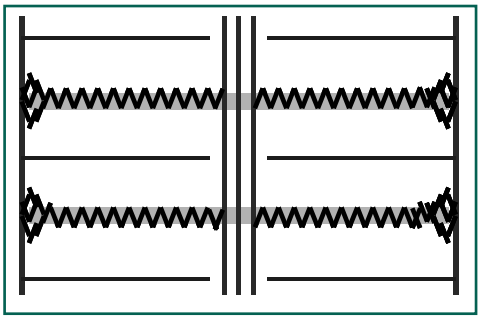

Figure 2. Schematic representation of a MTrP with myosin filaments literally stuck in titin gel at the Z-line (after Wang K, Yu L. Emerging Concepts of Muscle Contraction and Clinical Implications for Myofascial Pain Syndrome. Presented at Focus on Pain 2000, Mesa, AZ: Janet G. Travell, MD Seminar Series[sm].)

Histological studies have confirmed the presence of extreme sacromere contractions, resulting in localized tissue hypoxia.[22] Brückle and colleagues established that the local oxygen saturation at a MTrP site is less than 5% of normal.[23] Hypoxia leads to the release of local release of several nociceptive chemicals, including bradykinin, CGRP, and substance P, among others, which have been detected in abnormal high concentrations at MTrPs.[13] Bradykinin is a nociceptive agent that stimulates the release of tumor necrosing factor and interleukins, some of which in turn can stimulate the further release of bradykinin. Calcitonin gene-related peptide modulates synaptic transmission at the neuromuscular junction by inhibiting the expression of AChE, which is another likely mechanism that contributes to the excessively high concentration of ACh.

Split fibers, ragged red fibers, type II fiber atrophy, and fibers with a moth-eaten appearance have been detected in MTrPs.[22] Ragged red fibers and moth-eaten fibers are also associated with muscle ischemia and represent an accumulation of mitochondria or a change in the distribution of mitochondria or the sarcotubular system respectively.

Combining these various lines of research, it can be concluded that MTrPs function as peripheral nociceptors that can initiate, accentuate, and maintain the process of central sensitizaton.[24] As a source of peripheral nociceptive input, MTrPs are capable of unmasking sleeping receptors in the dorsal horn, resulting in spatial summation and the appearance of new receptive fields, which clinically are identified as areas of referred pain. The MTrPs are commonly associated with other pain states and diagnoses, including complex regional pain syndrome, and should be considered in the clinical management.[25] Treatment of MTrPs is only one of the components of the therapeutic program, and does not replace other therapeutic measures, such as joint mobilizations, posture training, strengthening, etc. As MTrPs are easily accessible to trained hands, inactivating MTrPs is one of the most effective and fastest means to reduce pain. Dry needling is the most precise method currently available to physical therapists.

Myofascial trigger points can be identified by palpation only. There are no other diagnostic tests that can accurately identify an MTrP, although new methodologies using piezoelectric shockwave emitters are being explored.[26] Excellent inter-rater reliability has been established.[20,27] Simons, Travell, and Simons describe 2 palpation techniques for the proper identification of MTrPs. A flat palpation technique is used for example with palpation of the infraspinatus, the masseter, temporalis, and lower trapezius. A pincher palpation technique is used for example with palpation of the sternocleidomastoid, the upper trapezius, and the gastrocnemius.

Trigger point dry needling

Janet Travell pioneered the use of MTrP injections that eventually led to the development of dry needling. Her first paper describing MTrP injection techniques was published in 1942, followed by many others. Together with Dr. David Simons she wrote the 2-volume Trigger Point Manual.[3,28] Many studies have confirmed the benefits of trigger point injections even though a recent review article could not demonstrate clinical efficacy

beyond placebo.[5,29] In 1979 Lewit confirmed that the effects of needling were primarily due to mechanical stimulation of a MTrP with the needle.[30] Dry needling of a MTrP using an acupuncture needle caused immediate analgesia in nearly 87% of needle sites. In over 31% of cases, the analgesia was permanent. Twenty percent had several months of pain relief, 22% several weeks, and 11% several days. Fourteen percent had no relief at all.[30]

Dry needling an MTrP is most effective, when local twitch responses (LTR) are elicited.[31] A LTR has been shown to inhibit abnormal end plate noise. Current (unpublished) research strongly suggests that a LTR is essential in altering the chemical milieu of an MTrP (Shah, 2004, personal communication). Patients commonly describe an immediate reduction or elimination of the pain complaint after eliciting LTRs. Once the pain is reduced, patients can start active stretching, strengthening, and stabilization programs. Eliciting a LTR with dry needling is usually a rather painful procedure. Post- needling soreness may last for 1 to 2 days, but can easily be distinguished from the original pain complaint. Patients with chronic pain frequently report to have received previous trigger point injections; however, many state that they never experienced LTRs. Accurate needling requires clinical familiarity with MTrPs and excellent palpation skills.

Dr. Peter Baldry has adopted the Travell and Simons trigger point model, but prefers a gentler and less mechanistic approach to needling MTrPs when possible. According to Baldry, using a superficial needling technique is nearly always effective. With superficial dry needling, the needle is placed in the skin and cutaneous tissues overlying an MTrP. Baldry agrees that both superficial and deep dry needling have their place in the management of MTrPs.[32] A recent study confirmed that both superficial and deep dry needling are effective with dry needling having a stronger and more immediate effect.[33]

Radiculopathy Model

In Canada, Dr. Chan Gunn developed his 'radiculopathy model' and coined the term 'intramuscular stimulation' instead of dry needling.[34] Gunn has expressed the belief that myofascial pain is always secondary to peripheral neuropathy or radiculopathy and therefore, myofascial pain would always be a reflection of neuropathic pain in the musculoskeletal system. Because of muscle shortening, which in this model is always due to neuropathy, 'supersensitive nociceptors' may be compressed, leading to pain. The radiculopathy model is based on Cannon and Rosenblueth's "Law of Denervation." According to this law, the function and integrity of innervated structures is dependent upon the free flow of nerve impulses to provide a regulatory or trophic effect. When the flow of nerve impulses is restricted, the innervated structures become atrophic, highly irritable, and supersensitive. Striated muscles are thought to be the most sensitive innervated structures and according to Gunn, become the "key to myofascial pain of neuropathic origin." Because of the neuropathic supersensitivity, Gunn states that muscle fibers "can overreact to a wide variety of chemical and physical inputs including stretch and pressure." The mechanical effects of muscle shortening may result in commonly seen conditions, such as tendonitis, arthralgia, and osteoarthritis. Shortening of the paraspinal muscles is thought to perpetuate radiculopathy by disc compression, narrowing of the intervertebral foramina, or by direct pressure on the nerve root.

Gunn found that the most effective treatment points are always located close to the muscle motor points or musculotendinous junctions. They are distributed in a segmental or myotomal fashion in muscles supplied by the primary anterior and posterior rami. In Gunn's model, MTrPs do not play an important role. Because the primary posterior rami are segmentally involved in the muscles of the paraspinal region, including the multifidi, and the primary anterior rami with the remainder of the myotome, the treatment must always include the paraspinal muscles as well as the more peripheral muscles. Gunn found that the tender points usually coincide with painful palpable muscle bands in shortened and contracted muscles. He suggests that nerve root dysfunction is particularly due to spondylotic changes. He maintains that relatively minor injuries would not result in severe pain that continues beyond a 'reasonable' period, unless the nerve root would already be in a sensitized state prior to the injury.

Gunn's assessment technique is based on the evaluation of specific motor, sensory, and trophic changes. The main objective of the initial examination is to determine which levels of neuropathic dysfunction are present in a given individual. The examination is rather limited and does not include standard medical and physical therapy evaluation techniques, including common orthopaedic or neurological tests, laboratory tests, electromyographic or nerve conduction tests or radiologic tests, such as MRI, CT scan, or even X-rays. Motor changes are assessed through a few functional motor tests and through systematic palpation of the skin and muscle bands along the spine and in the peripheral muscles of the involved myotomes. Gunn emphasizes to assess trophic changes in the paraspinal regions segmentally corresponding to the area of dysfunction. Trophic changes may include orange peel skin (peau d'orange), dermatomal hair loss, differences in skin folds, and moisture levels (dry vs. moist skin).[34]

Unfortunately, Gunn's radiculopathy model as a hypothesis to explain chronic musculoskeletal pain has not really been developed beyond its initial inception in 1973. Although Gunn has published numerous interesting case reports and review articles restating his opinions, most components of the model have not been subjected to scientific investigations and verification. In fact, many of Gunn's underlying assumptions are contradicted by more recent research findings. For example, Gunn's notion that persistent nociceptive input is uncommon contradicts many recent neurophysiological studies confirming that persistent and even relative brief nociceptive input can result in pain producing plastic dorsal horn changes.

The major contributions of Gunn to the field of MPS and dry needling are the emphasis on segmental dysfunction and the suggestion that neuropathy may be a possible cause of myofascial dysfunction. Certainly with regard to motor dysfunction associated with MPS, the combined impact of the primary anterior and posterior rami is an important consideration. For example, from a segmental perspective, it would be likely to see dysfunction of the C5-C6 paraspinal muscles when MTrPs are present in the more peripheral infraspinatus muscle.

The Spinal Segmental Sensitization Model

The Spinal Segmental Sensitization Model is developed by Dr. Andrew Fischer and combines aspects of Travell and Simons' trigger point model and Gunn's radiculopathy model.[35] Fischer proposes that the "pen-

tad of the vicious cycle of discopathy, paraspinal muscle spasm and radiculopathy" consists of paraspinal muscle spasm frequently responsible for compression of the nerve root, narrowing of the foraminal space, and a sprain of the supraspinous ligament with radicular involvement. Fischer advocates a comprehensive medical evaluation. According to Fischer, the most effective methods for relief of musculoskeletal pain include preinjection blocks, needle and infiltration of tender spots and trigger points, somatic blocks, spray and stretch methods, and relaxation exercises. Based on empirical observations, Fischer routinely infiltrates the supraspinous ligament, which "inactivates tender spots/trigger points in the corresponding myotome, relaxing the taut bands, and increasing the pressure pain thresholds as documented by algometry." The MTrP injections with Fischer's needling and infiltration technique are thought to "mechanically break up abnormal tissue" and "a layer of edema." The main differences between Fischer's and Gunn's approach are the extent of the physical examination, the use of injection needles by Fischer, and acupuncture needles by Gunn, Fischer's recognition of the importance of MTrPs, and the infiltration of the supraspinous ligament. Furthermore, Fischer's model seems more dynamic. He has integrated many new research findings into his approach; for example, Fischer acknowledges that central sensitization is often due to ongoing peripheral nociceptive input. Fischer's proposed interventions use multiple injection techniques and are therefore not that useful for physical therapists. As far is known, the Maryland Board of Physical Therapy Examiners is the only physical therapy board that has ruled that physical therapists may perform MTrP injections.

MECHANISMS OF DRY NEEDLING

Although muscle needling techniques have been used for thousands of years in the practice of acupuncture, there is still much uncertainty about their underlying mechanisms. The acupuncture literature may provide some answers, however, due to its metaphysical and philosophical nature, it is difficult to apply traditional acupuncture principles to the practice of using acupuncture needles in the treatment of MPS.

Mechanical Effects

Dry needling of an MTrP may mechanically disrupt the integrity of the dysfunctional motor end plates. From a mechanical point of view, needling of MTrPs may be related to the extremely shortened sarcomeres. It is plausible that an accurately placed needle provides a localized stretch to the contracted cytoskeletal structures, which may disentangle the myosin filaments from the titin gel at the Z-band. This would allow the sarcomere to resume its resting length by reducing the degree of overlap between actin and myosin filaments.

If indeed a needle can mechanically stretch the local muscle fiber, it would be beneficial to rotate the needle during insertion. Rotating the needle results in winding of connective tissue around the needle, which clinically is experienced as a 'needle grasp.' Comparisons between the orientation of collagen following needle insertions with and without needle rotation demonstrated that the collagen bundles were straighter and more nearly parallel to each other after needle rotation.[36] Langevin and colleagues report that brief mechanical stimulation can induce actin cytoskeleton reorganization and increases in proto-oncogenes expression, including cFos and tumor necrosing factor and interleukins.[36] Moving the needle up and down as is done with needling of a MTrP may be sufficient to cause a needle grasp and a resultant LTR. As a result of mechanical stimulation, group II fibers will register a change in total fiber length, which may activate the gate control system by blocking nociceptive input from the MTrP and hence cause alleviation of pain.[32]

The mechanical pressure exerted via the needle also may electrically polarize the connective tissue and muscle. A physical characteristic of collagen fibers is their intrinsic piezoelectricity, a property that allows tissues to transform mechanical stress into electrical activity necessary for tissue remodeling, possibly contributing to the LTR.[37]

Neurophysiologic Effects

In his arguments in favor of neurophysiological explanations of the effects of dry needling, Baldry concludes that with the superficial dry needling technique, A-delta nerve fibers (group III) will be stimulated for as long as 72 hours after needle insertion. Prolonged stimulation of the sensory afferent A-delta nerve fibers may activate the enkephalinergic inhibitory dorsal horn interneurons, which would imply that superficial dry needling causes opioid mediated pain suppression.[32]

Another possible mechanism of superficial dry needling is the activation of the serotonergic and noradrenergic descending inhibitory systems, which would block any incoming noxious stimulus into the dorsal horn. The activation of the enkephalinergic, serotonergic, and noradrenergic descending inhibitory systems occurs with dry needle stimulation of A-delta nerve fibers anywhere in the body.[32] Skin and muscle needle stimulation of A-delta and C-(group IV) afferent fibers in anesthetized rats was capable of producing an increase in cortical cerebral blood flow, which was thought to be due to a reflex response of the afferent pathway, including group II and IV afferent nerves and the efferent intrinsic nerve pathway, including cholinergic vasodilators.[38] Superficial needling of certain acupuncture points in patients with chronic pain showed similar changes in cerebral blood flow.[39]

Gunn's and Fischer's techniques of needling both the paraspinal muscles and peripheral muscles belonging to the same myotome, appear to be supported by several animal studies. For example, Takeshige and Sato determined that both direct needling into the gastrocnemius muscle and into the ipsilateral L5 paraspinal muscles of a guinea pig resulted in significant recovery of the circulation, after ischemia was introduced to the muscle using tetanic muscle stimulation.[40] They also confirmed that needling of acupuncture points and non-acupuncture points involved the descending pain inhibitory system, although the actual afferent pathways were distinctly different. Acupuncture analgesia involved the medial hypothalamic arcuate nucleus of the descending pain inhibitory system, while non-acupuncture analgesia involved the anterior part of the hypothalamic arcuate nucleus. In both kinds of needle stimulation, the posterior hypothalamic arcuate nucleus was involved. There is no research to date that clarifies the role of the descending pain inhibitory system with needling of MTrPs.

Chemical Effects

The studies by Shah and colleagues demonstrated that the increased levels of various chemicals, such as bradykinin, CGRP, substance P, and others, at MTrPs are immediately corrected by eliciting a LTR with an acupuncture needle. Although it is not known what happens

to these chemicals when a needle is inserted into the MTrP, there is now strong albeit unpublished data that suggest that eliciting a LTR is essential.[13]

STATUTORY CONSIDERATIONS

Whether from a legal or statutory perspective, physical therapists can perform dry needling techniques, has not been considered in most states. However, the physical therapy state boards of Maryland, New Mexico, New Hampshire, and Virginia have officially determined that dry needling falls within the scope of physical therapy practice in those states.

Dry needling by physical therapists must be regulated by state boards of physical therapy and not by state boards of acupuncture or oriental medicine. Dry needling is not equivalent to acupuncture and should not be considered a form of acupuncture. For example, the New Mexico Acupuncture and Oriental Medicine Practice Act[a] defines acupuncture as "the use of needles inserted into and removed from the human body and the use of other devices, modalities and procedures at specific locations on the body for the prevention, cure or correction of any disease, illness, injury, pain, or other condition by controlling and regulating the flow and balance of energy and functioning of the person to restore and maintain health."

Obviously, dry needling involves the use of needles inserted into and removed from the human body; however, that is the only similarity between dry needling and acupuncture. Similarly, if a hammer is associated with carpenters, do plumbers become carpenters every time they use a hammer? The objective of dry needling is not to control and regulate the flow and balance of energy and is not based on Eastern esoteric and metaphysical concepts. The fact that needles are being used in the practice of dry needling does not imply that an acupuncture board would automatically have jurisdiction over such practice. If so, physicians and nurses would also need to conform to the statutes of acupuncture, as they also "insert and remove needles."

Many boards of physical therapy in the United States have adopted a variation of the "Model Practice Act for Physical Therapy" developed by the Federation of State Boards of Physical Therapy (http://www.fsbpt.org). Neither the Model Practice Act or any of the actual state practice acts address whether dry needling falls within the scope of physical therapy practice. However, based on the definitions of physical therapy practice, dry needling may well fall within the scope of practice in nearly all states. The respective statutes commonly include statements like "the practice of physical therapy means administering treatment by mechanical devices," "mechanical modalities," or "mechanical stimulation." Exclusions to the practice of physical therapy are frequently defined as "the use of roentgen rays and radioactive materials for diagnosis and therapeutic purposes, the use of electricity for surgical purposes, and the diagnosis of disease." Most state physical therapy acts do not specifically prohibit the use of needles.

Whether physical therapists are legally allowed to penetrate the skin has been addressed in few statutes and usually only in the context of performing electromyography and nerve conduction tests. The Model Practice Act does include "electrodiagnostic and electrophysiologic tests and measures." For example, the Missouri Revised Statutes[b] indicate that "physical therapy [...] does not include the use of invasive tests," yet, the statutes state specifically "physical therapists may perform electromyography and nerve conduction test" even though they "may not interpret the results." The California Physical Therapy Act[c] does address the issue of "tissue penetration:" "A physical therapist may, upon specified authorization of a physician and surgeon, perform tissue penetration for the purpose of evaluating neuromuscular performance as part of the practice of physical therapy [...] provided the physical therapist is certified by the board to perform tissue penetration and provided the physical therapist does not develop or make diagnostic or prognostic interpretations of the data obtained." It is not clear whether the California practice act would allow dry needling at this time. In any case, it appears that physical therapists would need to be certified by the board to perform tissue perforation.

The definition of physical therapy practice in the 2004 Florida Statutes[d] includes "the performance of acupuncture only upon compliance with the criteria set forth by the Board of Medicine, when no penetration of the skin occurs."The Florida board does not indicate how acupuncture or for that matter, dry needling, would be performed without penetrating the skin and this remains a mystery. Interestingly, the physical therapy practice act in Florida does include "the performance of electromyography as an aid to the diagnosis of any human condition."

In order to practice dry needling, physical therapists would have to be able to demonstrate competency or adequate training in the examination and treatment of persons with MPS and in the technique of dry needling. Many statutes address the issue of competency by including language like "a physical therapist shall not perform any procedure or function for which he is by virtue of education or training not competent to perform." Obviously, physical therapists employing dry needling must have excellent knowledge of anatomy and be very familiar with the indications, contraindications, and precautions.

In summary, most physical therapy practice acts may allow dry needling, according to the various definitions of "practice of physical therapy." Whether individual state boards would interpret their statutes in a similar fashion as the Maryland, New Mexico, New Hampshire, and Virginia physical therapy state boards have, remains to be seen.

[a] New Mexico Statutes Annotated 1978, Chapter 61, Professional and Occupational Licenses, Article 14A, Acupuncture and Oriental Medicine Practice, 3, Definitions

[b] Missouri Revised Statutes, Chapter 334, Physicians and Surgeons – Therapists – Athletic Trainers, Section 334.500, Definitions

[c] California Business and Professions Code, Division 2, Healing Arts, Chapter 5.7, Physical Therapy, Section 2620.5

[d] The 2003 Florida Statutes, Title XXXII, Regulation of Professions and Occupations, Chapter 486, Physical Therapy Act, Section 486.021, Definitions, 11, Practice of Physical Therapy

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Considerations for Differential Diagnosis of an Ankle Sprain in the Adolescent

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INTRODUCTION

The diagnosis of 'ankle sprain' is commonly seen for both the adult and adolescent populations. Injuries to the foot and ankle may quickly be dismissed as ankle sprains, particularly in the adolescent population, without adequate history, physical examination, or diagnostic testing. This can occur because injuries obtained by an adolescent potentially fall between the expertise of a pediatrician, who specializes in the treatment of children, and the expertise of an orthopaedic surgeon, who specializes in the treatment of adults. A physical therapist treating the adolescent foot and ankle needs to be aware of other potential pathologies that should be considered when an adolescent patient is referred to physical therapy with the diagnosis of 'ankle sprain.' These pathologies include osteochondrosis, osteochondritis dissecans, accessory ossicle, anterior impingement syndrome, sinus tarsi syndrome, tarsal coalition, and epiphyseal fractures.

OSTEOCHONDROSIS

Osteochondrosis is an injury to an ossification center resulting in inflammation, degeneration, recalcification, necrosis, and/or fragmentation.[1] It can occur at an epiphyseal center of a long bone or apophyseal area where a tendon inserts. Osteochondrosis at an apophyseal area is typically referred to as apophysitis. An adolescent may develop apophysitis due to an overuse injury while an adult would get tendonitis. Common examples of osteochondrosis include Sever disease and Freiberg disease. Freiberg disease is osteochondrosis of the epiphyseal center of the metatarsal, and Sever disease is apophysitis where the Achilles tendon inserts on the calcaneus.[2] Symptoms consist of localized pain and swelling. Treatment for these diseases should focus on reducing any abnormal stress. Freiberg disease is the result of abnormal stress on the metatarsal while the second metatarsal is most commonly involved.[2] Freiberg disease can result from abnormal pronation or an excessively long second metatarsal. Treatment of this pathology can include the use of a metatarsal pad or bar to reduce the weight bearing forces on the metatarsal. Treatment also should include restoration of normal biomechanics as indicated. Sever disease is a traction type injury that results from tight heel cords.[2] Treatment of this condition should focus on normalizing flexibility of the Achilles tendon.

OSTEOCHONDRITIS DISSECANS

Osteochondritis dissecans and osteochondral lesions represent the same entity and relate to an injury of the articular cartilage and/or the underlying bone.[3] The anterolateral and posteromedial locations on the talus are susceptible to injury when the talocrural joint undergoes torsional stress, through either impact or cyclical loading.[4,5] When the subchondral bone is involved, avascular necrosis with resulting bone infarction can occur. If the overlying articular cartilage remains intact, a space is created between the living bone and articular cartilage. An in-growth of fibrous tissue may result and if this tissue in not displaced healing can take place. The symptoms associated with this injury are related to the stability of the fragment[2] and can be similar to those commonly reported after an ankle sprain. If the fragment is maintained by the cartilage, symptoms may be mild. The symptoms will be more severe if a fragment brakes off into the joint with sensations of giving way secondary to sharp pain, catching, and/or locking. Treatment and prognosis depends on the size and location of the lesion as well as the stability of the fragment.[5] Activities that may disrupt the healing fragment must be avoided. This would included weight bearing activities where twisting may occur, such as challenging balance and proprioceptive exercises. Surgical treatment can involve debridement and stabilization of the fragment. In cases when significant bone necrosis has occurred, bone grafting may be required.[4,5]

ACCESSORY OSSICLE

An accessory ossicle (accessory bone) is an ossification center that has not fused. This occurs in 10% of the population. Common locations include the fibular malleolus, tibular malleolus, navicular, and talus.[4] Inversion, eversion, or torsional ankle injuries can make an accessory bone at the distal fibula or tibia symptomatic. An accessory navicular bone can become symptomatic where the posterior tibial tendon attaches in an individual with excessive pronation. An accessory bone present on the posterolateral process of the talus is commonly called os trigonum.[4] Symptoms associated with os trigonum include pain with maximum plantar flexion as the posterior talus impinges on the posterior tibia. An accessory bone can be differentiated from a fracture radiographically as an accessory bone will have rounded edges where a fracture will have sharp edges.[4] Treatment involves symptom reduction with restoration of normal strength, range of motion, and biomechanics as needed. If symptoms persist, surgical removal of the bone may be required but is not done until skeletal maturity is achieved.[4]

ANTERIOR IMPINGEMENT SYNDROME (FOOTBALLERS ANKLE)

Anterior impingement can result from repeated forced plantar flexion to the extreme of movement or from direct trauma, as seen with soccer players when they kick the ball with the top of their foot.[6] At the anterior talocrural joint, thickening of the joint capsule can occur with or without the development of bone spurs on the distal tibia and talus. These spurs can be the result of the recurrent traction or direct trauma. Symptoms include pain in the anterior talocrural joint with maximum dorsiflexion.[6,7] Limited ankle dorsiflexion range of motion can be seen, and if bone spurs are present, a hard end-feel will be noted. Treatment should restore as much range of motion as possible without increasing symptoms. Also, the repetitive movement that is causing the injury must be identified and prevented. Surgical removal of the bones may be required in severe cases.

SINUS TARSI SYNDROME

The sinus tarsi is located between the inferior neck of the talus and the superior aspect of the calcaneus. It is inferior and slightly anterior to the anterior talofibular ligament. Structures within the sinus tarsi include the interosseous talocalcaneal liga-

ment, cervical ligament, and inferior attachment of the extensor retinaculum.[8] The mechanism of injury involves an inversion sprain in a plantar flexed position that injures both the talocrural and subtalar joint. This type of extreme movement can sprain the ligaments within the sinus tarsi. Symptoms can include a feeling of hindfoot instability when walking on uneven ground. Pain will be reproduced when palpating the structures within the sinus tarsi.[8,9] If repeated ankle sprains are the cause of the injury, then treatment should include strengthening and proprioceptive exercises. If abnormal biomechanics are identified, they may need to be corrected.

TARSAL COALITION

Tarsal coalition is a congenital union between two or more tarsal bones and can involve the talus, calcaneus, navicular, cuboid, and/or cuneiforms.[10] The fusion is usually composed of fibrous cartilaginous bars and may be complete or incomplete. Tarsal coalition is present in 1% of population, and when present, the coalition is found bilaterally 50% to 60% of the time.[10] Calcaneonavicular coalition is the most common location followed by talocalcaneal coalition. The prominent sign is a rigid flatfoot as the presence of a tarsal coalition will restrict motion of the tarsal bones. The peroneal muscles may spasm when attempts are made to invert the foot. If calcification of the fibrous cartilage occurs during adolescence, the involved joint will become essentially fused and the foot will become more rigid.[10] Stiffness of the midfoot may make the individual more susceptible to ankle sprains. The presence of a tarsal coalition may go unnoticed until an injury, such as an ankle sprain, where a previously asymptomatic coalition becomes symptomatic.[10] Treatment should normalize range of motion in the joints not involved, while strengthening exercises are done to help prevent excessive stress and strain on the involved joint. Shoes with good support and orthotics can also be helpful to prevent movement of the involved joint. If the symptoms continue, surgical resection and osteotomy can be performed. If the coalition is discovered before degenerative changes occur, surgical excision of the coalition has been shown to have good results. If degenerative changes have occurred, a triple arthrodesis may be necessary.[10]

EPIPHYSEAL FRACTURES

Epiphyseal fractures involve disruption of the growth plate at an epiphyseal center. A young athlete is at greater risk for this type of fracture because of the strength of the surrounding soft tissue, capsule, and ligaments compared to the epiphyseal plate. Epiphyseal fractures of the ankle can occur by the same mechanism of injury as a sprain. Generally epiphsyeal fractures can do well provided the blood supply is intact and weight bearing forces remain normal.[3]

SUMMARY

A physical therapist treating foot and ankle pain in the adolescent population needs to be aware of the pathologies that can occur in this age group. Table 1 outlines some of the common pathologies that can be associated with ankle pain in the adolescent. Being able to recognize the signs and symptoms associated with these pathologies will allow one to appropriately treat these individuals and make appropriate referrals and recommendations when needed.

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Table 1. Potential Pathologies Associated with Adolescent Ankle Injuries

Pathology	Definition	Symptoms	Signs
Sever Ostoechondrosis	Calcaneal apophysitis	Localized pain at the at the Achilles attachment	Localized tenderness
Talocrural Osteochondritis Dissecans	Injury to articular cartilage and/or underlying bone	Catching, locking, and/or sudden sharp stabbing pains	
Accessory Ossicles at the Distal Tiba or Fibula	Ossification centers that have not fused	Localized pain	Localized tenderness Accessory bone with rounded edges on radiographs
Accessory Os Trigonum	Accessory ossicle on the posteriorlateral process of the talus	Pain posteriorly with maximum plantar flexion	Accessory bone with rounded edges on radiographs
Anterior Ankle Impingement	Thickening of joint capsule with or without bone spurs at the anterior talocrural joint	Pain anteriorly with sudden sudden dorsiflexion	Decreased dorsiflexion range of motion A hard end-feel if bone spurs are present
Sinus Tarsus Syndrome	Injury to the structures contained within the sinus tarsus	Hindfoot instability	Tenderness inferior and anterior to the anterior talofibular ligament
Tarsal Coalition	Congenital union between two tarsal bones: usually calcaneo-navicular or talocalcaneal coalition	Localized tenderness over the involved joint	Rigid flat foot and peroneal muscle spasm with inversion
Distal Tibal Epiphyseal Fractures	Growth plate injury	Inability to weight bear	Tenderness at the distal tibia

Reliability of Palpation Assessment in Non-neutral Dysfunctions of the Lumbar Spine

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INTRODUCTION AND LITERATURE REVIEW

Mechanical dysfunction is detected with testing procedures that measure palpable positional irregularity and altered tissue tension. Furthermore, the signs of altered mobility in a region provide one of the most important indicators of the overall level of dysfunction in the region in question.[1]

Vertebral mobility testing forms an integral part in evaluating mechanical spinal dysfunction and has been the practice of manual therapists treating spinal dysfunction. However, the tools used in manual therapy, for assessment of mobility are qualitative and subjective.The need for multiple examiners to be able to detect the same level of restriction in a given segment is hence, essential.[2]

Reliability studies are reported in literature on mobility testing of the spinal joints.[3-7] However, when reviewing literature, with regards to studies on passive motion analysis, the inconsistency in inter-rater reliability is apparent.[3-7] The tests are based on palpation cues by palpating the same bony prominence of one or more vertebrae (the spinous or transverse process) and passively putting the segments through successive ranges of motion as in forward, backward or side bending and rotation.[4] The alternate method is to apply postero-anterior pressure on the spinous or transverse process.[8] The examiner then attempts to define quality of restriction in the directions examined based on the feel of the movement of the bony prominences palpated, or on which pressure is applied.[3,4,7]

The sources of variability in this method may be due to a variety of factors: pain interference, inconsistency in patient positioning, range of motion executed, etc. Some joints are more easily examined than others. It may be easier to test an asymptomatic joint as opposed to a symptomatic joint.Although these are clinically effective methods, they pose 3 major drawbacks.

1. The introduction of multiple movements from a diagnostic perspective, may actually accomplish a mobilization, making it difficult for the subsequent examiners to perceive the same finding.
2. There poses a difficulty to be able to make an assessment to see if treatment for the identified restriction has actually caused a segment specific and not a gross change in mobility.
3. In passive motion analysis a grading scale is commonly used. There are numbers assigned to an observation and based on a certain definition. These numbers can be subject to different interpretations making grading variable between examiners.

Maher, Adams and Simmons[9] conducted studies to investigate if poor inter rater reliability for testing posteroanterior stiffness was due to rater bias, or was a consequence of raters having individual concepts of stiffness. The result of the study showed that poor reliability was due to an incomplete agreement of the concept of stiffness rather than rater bias. It was hypothesized that the construct of spinal stiffness had more than one dimension. Jull and colleagues[10] describes that abnormal stiffness has two distinct features. She describes a 'reactive tissue stiffness' and an 'articular, (probably) capsular stiffness.' As clinicians tend to have their own concept of stiffness, this may hypothetically explain why intra-rater reliability tends to be higher than inter rater reliability as in the study conducted by Gonella, Paris and Kutner.[4] Since clinicians have their individual concepts of stiffness and not being able to infer the source of stiffness as it has more than one dimension, the need for a reliable testing procedure is crucial.

CLASSIFYING MOVEMENT DYSFUNCTION

To address the concerns described above the following method of evaluation was adopted.[11] The clinician palpates and follows the paired transverse processes of a vertebral segment to assess for their asymmetry in forward bending, neutral, and backward bending positions.

The transverse processes are placed about an inch lateral to the spinous process and their levels with relation to the spinous process vary with the different levels of the vertebral column. For the lumbar transverse process, however, palpation is done by first locating the spinous process to determine the level and moving slightly laterally and upwards by placing the thumbs on either sides of the spinous process.

Vertebral dysfunctions do not always occur in isolation.[12] It usually is a combination of movements occurring as a combination in the 3 planes.This is due to: (1) the nature of normal movement, and (2) the orientation of the facet joints. The key movement is rotation, as rotation will determine the prominence of the transverse process. This prominence is what is termed as a 'posteriority' and is the key to eliciting a spinal movement dysfunction. It appears as a posterior projection on forward and backward bending that causes the layers of muscle over it to be pushed outward, thereby adding to the prominence.

The movements of the vertebral column occur in diagonal patterns as a combination of flexion or extension with the coupled motion of side bending and rotation. In the lumbar spine, this coupled motion occurs in opposite directions and are termed as 'neutral' mechanics. Such a situation maintains neutral alignment with minimal stress on the surrounding soft tissue structures. However, in the presence of a restriction the coupled motion of side bending and rotation can occur to the same side, with flexion or extension. This is termed as 'nonneutral mechanics' and 2 possibilities can exist;[11] they are as follows:

Extension, Rotation, Sidebending (ERS)
Flexion, Rotation, Sidebending (FRS)

EXTENSION, ROTATION, SIDEBENDING

During flexion, the facets slide equally forward and the exact opposite occurs (sliding backward) during extension. Considering two segments as an example, L5 and S1 and assuming the left facet of L5 is restricted, or stuck in extension. In the neutral position, the transverse processes are neutral and hence will appear neutral (Figure 1).

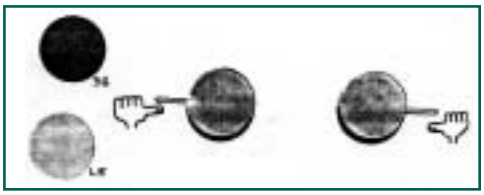

Figure 1

In backward bending, the left facet is already stuck in extension and hence will appear posterior. The right facet also moves posteriorly as it is not stuck and is moving freely. Since both are posterior they will appear neutral in backward bending (Figure 2).

Figure 2

However, in forward bending, since the right facet is moving freely it slides forward but since the left facet is stuck in extension it remains where it is (in extension) This will appear as a prominence of the L5 transverse process on the left. Hence the dysfunction is an **ERS left of L5,** as the segment is stuck in extension and there is accompanying rotation and sidebending (Figure 3). The 'side' of the diagnosis is always the side of the posteriority

Figure 3

FLEXION, ROTATION, SIDEBENDING

Assuming that the left L5 facet is stuck in flexion. In neutral they invariably appear neutral (Figure 4). During forward bending, the left facet is already stuck in flexion and hence has slid forward. The right facet is freely moving and will also slide forward. On palpation of the transverse processes in forward bending there is no evidence of a posteriority as both facets have slid forward and are neutral (Figure 5). However, during backward bending the right facet moves freely and hence slides backward. The left facet however is stuck in flexion. Hence, it stays in that position of flexion and does not slide backward. Here, since the right facet has slid backward the transverse process on that side appears posterior but the left does not as it is in flexion (Figure 6).

Figure 4

Figure 5

Figure 6

The restriction is on the left as it is the left facet that is stuck in flexion, but the posteriority is on the right as the freely moving right facet has slid backward. Hence the dysfunction is an **FRS right of L5** as it is always by the side of the posteriority and not by the side of the restriction. The reasons for preference of this method of vertebral motion testing are as follows:[11]

1. This method does not put the segment through a mobilization procedure and thus not changing the vertebral mechanics to any appreciable amount. This makes it possible for the examiner to be more confident in the post treatment evaluation of a segment that, in fact, some change has occurred in the motion present before and after treatment.
2. This procedure is easier for multiple examiners to apply because of the non-treatment aspect of the method. The findings remain much more consistent across examiners and across time.
3. It also enables the clinician to differentiate between a structural and functional asymmetry of a vertebral segment. Structural asymmetries occur fairly frequently and palpation of a posterior transverse process cannot distinguish asymmetrical development from actual dysfunction of a rotational nature. This is usually evident when the prominence of the transverse process remains through the three positions of forward bending, neutral and backward bending. However, a functional asymmetry may still show such a prominence when there is an ERS dysfunction on one side and an FRS dysfunction on the other. This can be differentiated from a structural asymmetry by monitoring the interspinous space during forward and backward bending.

METHODS

Thirty-one symptomatic male and female subjects, between the ages of 30 and 70 signed an informed consent to be evaluated. Their primary complaints were pain in the low back area, with/without pain radiating into the leg. Two physical therapists with approximately 13 years of clinical experience and 5 to 8 years of experience in the examination of non-neutral dysfunctions of the lumbar spine examined the fifth lumbar segment for the presence of nonneutral dysfunction. The fifth lumbar segment was selected for the study due to the high incidence of low back problems arising from this segment.[13,14]

The subjects were randomly assigned between raters and evaluation was done on consecutive days averaging about 5 to 6 evaluations a day. All positions and ranges were controlled for reproducibility as follows: (1) bony landmarks of the fifth lumbar segment (transverse process) were marked following agreement, for consistency in palpation; and (2) identical test positions incorporating identical ranges of forward bending and backward bending, were utilized between raters.

The clinicians palpated and followed the paired transverse processes of L5 and evaluations were made in the forward bending, backward bending (Sphinx), and neutral positions.

Values were recorded by the evaluating clinicians and upon completion of evaluation, were tabulated as seen in Table 1. Agreement between the two examiners for a specific patient evaluation was marked 'positive.' Disagreement between the two examiners for a specific patient evaluation was marked 'negative.'

DATA ANALYSIS

Inter rater agreement for exact values were analyzed using SPSS (version 11.5) (19) and reported by Kappa values. The findings were coded by the type of dysfunction and was done for the purpose of statistical analysis. The coding was as follows.

ERSL	1
FRSL	0
ERSR	2
FRSR	3

RESULTS

Kappa results were significant (at p .05),

Method of Evaluation for an ERS Dysfunction

The 'Sphinx' Position

Method of Evaluation for an FRS Dysfunction in the 'Sphinx' Position

Table 1. Recorded Value

•ERSR	•ERSL, FRSL	•-VE
•FRSL	•FRSL	•+VE
•ERSL	•ERSL	•+VE
•FRSL	•FRSL	•+VE
•FRSL	•FRSL	•+VE
•NEUTRAL	•FRSL	•-VE
•FRSL	•FRSL	•+VE
•FRSL	•FRSL	•+VE
•ERSL	•ERSL	•+VE
•FRSL	•FRSL	•+VE
•FRSL, ERSL	•FRSL, ERSL	•+VE
•FRSL	•FRSL	•+VE
•FRSL	•FRSL	•+VE
•ERSR	•ERSL	•-VE
•FRSR	•FRSR	•+VE
•FRSL	•FRSL	•+VE
•ERSR, FRSR	•FRSL	•-VE
•FRSL, ERSL	•NEUTRAL	•-VE
•FRSL, ERSL	•FRSL, ERSL	•+VE
•ERSR, FRSR	•ERSR, FRSR	•+VE
•FRSR	•FRSR	•+VE
•FRSL	•FRSL	•+VE
•FRSR	•FRSR	•+VE
•ERSL, FRSL	•FRSR	•-VE
•ERSL	•ERSL	•+VE
•ERSL, FRSL	•FRSL, ERSL	•+VE
•ERSR, FRSR	•FRSL	•-VE
•FRSL	•ERSL	•-VE
•ERSL, FRSL	•ERSL, FRSL	•+VE
•FRSR	•FRSR	•+VE
•FRSL, ERSL	•FRSL, ERSL	•+VE

			RATER2				
			0	1	2	3	Total
RATER1							
	FRSL	Count	13	1	0	0	14
		Expected Count	7.2	3.9	.5	2.4	14.0
		% within RATER1	92.9%	7.1%	.0%	.0%	100.0%
		% within RATER2	86.7%	12.5%	.0%	.0%	48.3%
		% of Total	44.8%	3.4%	.0%	.0%	48.3%
	ERSL	Count	0	5	0	1	6
		Expected Count	3.1	1.7	.2	1.0	6.0
		% within RATER1	.0%	83.3%	.0%	16.7%	100.0%
		% within RATER2	.0%	62.5%	.0%	20.0%	20.7%
		% of Total	.0%	17.2%	.0%	3.4%	20.7%
	ERSR	Count	2	2	1	0	5
		Expected Count	2.6	1.4	.2	.9	5.0
		% within RATER1	40.0%	40.0%	20.0%	.0%	100.0%
		% within RATER2	13.3%	25.0%	100.0%	.0%	17.2%
		% of Total	6.9%	6.9%	3.4%	.0%	17.2%
	FRSR	Count	0	0	0	4	4
		Expected Count	2.1	1.1	.1	.7	4.0
		% within RATER1	.0%	.0%	.0%	100.0%	100.0%
% of		% within RATER2	.0%	.0%	.0%	80.0%	13.8%
Total		.0%	.0%	.0%	13.8%	13.8%	
Total		Count	15	8	1	5	29
		Expected Count	15.0	8.0	1.0	5.0	29.0
		% within RATER1	51.7%	27.6%	3.4%	17.2%	100.0%
		% within RATER2	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	51.7%	27.6%	3.4%	17.2%	100.0%

and there was a significant association between raters. Combined inter tester Kappa values as a measure of agreement between raters was 0.688 indicating 'substantial' agreement among raters.

DISCUSSION

Segmental examination for the presence of non-neutral dysfunction in the fifth lumbar segment demonstrated 'substantial' inter rater reliability. Landis and Koch[16] have suggested the following guidelines for determining a level of significance for the value of Kappa.

< 0	Poor
0.00-0.20	Slight
0.21-0.40	Fair
0.41-0.60	Moderate
0.61-0.80	Substantial
0.81-1.0	Almost perfect

The above assumption may not necessarily be valid at all times, rather its meaningfulness may depend on the context in which it is used. Consider, if one is determining inter rater reliability of measurements displayed on a digital display. Since a digital display has accurately quantified measurements, a value of 0.70 following statistical analysis may be considered low. However, if one is determining relationship between abstract constructs like self esteem or motivation which are difficult to quantify accurately, a value of 0.50 may be considered very strong.[2] In the context of this evaluation procedure that depends on palpation cues for very small movements the guidelines by Landis and Koch indicate 'substantial' agreement between examiners for a Kappa value of 0.68 (Figure 7).

The clinical relevance of this method of evaluation requires explanation.[11,17] Faulty mechanics, be it an ERS or an FRS can pro-

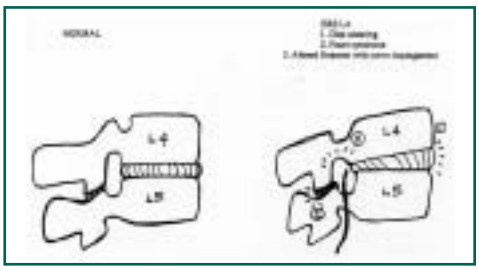

Figure 7

duce clinical scenarios we see in our day to day practice. The dysfunction that was discussed earlier is depicted in the diagram above only that the segment is an L4 over L5, for purpose of convenience in illustration. Note that L4 is restricted in extension and would hence be an ERS. It is speculated that if movement continues to occur in this abnormal position it can significantly shear the disc (which is part of the motion segment) and may result in a disc pathology. The size or the patency of the foramen is altered and as the nerve exits through the foramen it can be pinched, resulting in radicular pain. The facet, due to abnormal weight bearing stresses of faulty alignment can be susceptible to cartilage and facet capsule shearing. The effusion that occurs due to this can be poured into the foramen, increasing nerve root symptoms. Hence by freeing the facet restriction and correcting the alignment, the patency of the foramen is restored, the shearing of the disc is reduced and the facet joints are rendered less susceptible to loading stresses. This can significantly minimize symptoms.

The large muscle groups that effect movement in this motion segment can be stressed due to the faulty mechanics they have to sustain. Hence, correcting vertebral alignment can reduce work loads of these large spinal and pelvic muscles, which can later be effectively stabilized to maintain alignment.

CONCLUSION

This study concludes that 2 physical therapists evaluating 31 symptomatic subjects for non neutral lumbar dysfunction exhibited 'substantial' inter-rater reliability in evaluative findings. The explanation as to the context of which the statistical results are interpreted is worthwhile. Manual spinal mobility/dysfunction testing is based on palpation cues occurring in small joints for very small movements, not easily visualized. Hence a kappa value of 0.688 is considered substantial[16] in this context for the intricacy of the evaluation procedures.

Spinal mobility/dysfunction testing is an area that has been investigated by manual therapists for inter rater reliability.[3,4,7] Results have been favorable for intra rater reliability however not for inter rater reliability. The possible reason although attributed to extraneous variables, may in actuality be the testing procedure.[2,4] The pros and cons of the evaluation tests used in spinal mobility testing have been enumerated. The method of evaluation described in this article has not only proven to be clinically effective[11,17] but has exhibited reproducibility and consistency among raters. Further research should focus on comparing the efficacy of contemporary spinal mobility testing with the evaluation procedures described in this study.

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Evidence-based Practice in Outpatient Orthopaedic Physical Therapy: Using Research Findings to Assist Clinical Decision Making

Paul Beattie, PT, PhD, OCS

INTRODUCTION

Evidence-based practice (EBP) is rapidly being embraced within the physical therapy profession. Clinicians who strive to make informed decisions regarding patient management use the principles of EBP to select and interpret the most appropriate evaluation procedures and to implement interventions that have the best likelihood of success with the least risk.[1-5]

Despite its growing acceptance, EBP has been criticized as being inappropriate for many clinical situations. The difficulty of applying research findings to individual patients, as well the time required to review large amounts of research literature, have led to the suggestion that EBP may be an impractical system.[6,7] While these arguments have merit, it is important to note that research findings by themselves do not solely define EBP, nor are they necessary for every clinical decision. Sackett et al[3] have conceptualized EBP as an integration of the best available research evidence with the clinician's expertise and experience as well as the unique circumstances related to the specific patient. Considering this, research findings by themselves are of limited value clinically unless the skills and resources of the practitioner are adequate and the patient values the intervention in question.

Practitioners do not necessarily need to quote a research study to support every evaluative procedure or intervention used in the clinical setting. In those cases in which a patient response to treatment is highly predictable, for example expecting reduced pain when using an ice pack on an acute ankle sprain, it is probably not necessary for busy clinicians to search the literature for research support. However, as the *degree of uncertainty* regarding the optimal evaluation or treatment procedure increases, so too does the need for well-conducted research.[2]

The task of identifying the best research has been complicated by the astonishingly rapid proliferation of information related to patient management in physical therapy. While it is not reasonable to expect clinicians to obtain and critically review all of the new research in physical therapy, it is each individual's professional responsibility to be aware of the available research related to those specific patients for whom uncertainty regarding the optimal patient management strategy exists. Considering this, mechanisms that streamline the identification and appraisal of research findings are of great value in busy clinical facilities. The purpose of this paper is to describe and illustrate one process by which relevant research findings can be identified, appraised, and implemented in the care of a patient. This paper will follow sequence of the application of EBP that is described by Sackett et al[3] (Table 1). This process will be illustrated using a patient complaining of chronic, recurrent low back pain (LBP) who has radiographic findings of lumbosacral spondylolisthesis.

Table 1. The Process of EBP as Described by Sackett et al[3]

1. Identify a patient problem. Derive a specific question.
2. Search the literature.
3. Appraise the literature.
4. Integrate the appraisal of literature with your clinical expertise, experience, patient values and unique circumstances.
5. Implement the findings.
6. Assess outcome and re-appraise.

PATIENT CLINICAL PICTURE

The patient is a 28-year-old male who has been employed as a mail carrier for the last 3 years. He is working full-time without restriction. His work demands require prolonged standing and driving. He must frequently get in and out of his vehicle, and walk while carrying his mailbag that weighs approximately 45 lbs when full. His chief complaint is persistent pain in the lumbosacral area that ranges from 2/10 to 8/10 on work days and 0/10 to 3/10 on his days off. His symptoms are noticeably worsened when standing or walking for more than 10 minutes and are lessened when he is sitting. He can recall no back trauma. His symptoms began 2 years ago and have been recurring since that time. His most recent recurrence began 4 months ago and has been persistent since that time. Radiographs of the lumbar spine that were obtained 2 weeks ago reveal a grade 2 spondylolisthesis (50% anterior slippage) of L5 on S1. He has no other medical or surgical problems and is taking no medication. His goal is to be able to complete his day's work and activities of daily living without being limited by pain.

During the physical examination he stands with an erect posture and has equal limb length in the lower extremities. He can perform full lumbar flexion but complains of pain when returning to the upright position. He also complains of back pain during lumbar extension when standing and during combined lumbar extension and side bending rotation to left or right (posterior quadrant test). His symptoms are worsened by posterior to anterior directed pressures over the spinous process of L3-L5. He has no other obvious impairments noted during physical examination. His Oswestry Disability Index was 52% indicating a moderate degree of perceived pain and pain-related activity limitation (0% is the best functional score).[8]

THE FIRST STEP

Identify a Specific Patient Problem and Derive a Specific Question

For the purpose of this paper our patient problem can be described as persistent activity-related, nonradicular low back pain with concomitant radiographic findings of spondylolisthesis in a young adult with no other health problems. Our question will be, "what physical therapy intervention has the best evidence of treatment effectiveness for people in this profile?"

There are many forms of evidence available to us. A very reasonable way to start is to consider your own and your colleagues' experiences, eg, what has worked in the past? Reviewing notes from continuing education courses or textbooks is also valuable. These sources, however, have a potential to be biased and, although they often provide valuable information, they do not provide a high

degree of certainty. Considering this, it is appropriate to search the literature in an attempt to identify research findings that may provide a higher degree of certainty. Clinical research related to interventions can broadly be divided into 'nonresearch designs' such as case series or group designs that lack random assignment and 'research designs' that use a random assignment of intervention ie, randomized, controlled trials (RCT). While each of these designs have inherent strengths and weaknesses, the RCT represents the least biased design and is generally considered to provide the strongest evidence.[2,9]

The Next Step is to Search the Literature

The currently available computerized databases provide clinicians with a huge array of information. A useful directory of websites relating to EBP may be found at www.nettingtheevidence.org.uk. This website lists a large variety of other websites that address EBP for specific medical specialties and subspecialties. Although numerous choices exist, in this paper we'll discuss 2 specific websites that may be quite helpful. The first website is PubMed.com. The United States National Library of Medicine maintains this site. It contains over 14 million citations going back to the 1950s and uses the Medline Database. In addition to its very large reference database, it has several other advantages: it is free, and provides a simple search procedure that yields an abstract for each study as well as links to related articles. One can refine a search using the 'limits' command. For example, a search can be limited to certain dates or to include only RCTs or review papers.

We chose to perform an initial search using this site to gain an overview of the research relating to our specific question, ie, what is the best research evidence for physical therapy interventions directed toward patients with back pain and spondylolisthesis? The initial keywords we chose were 'physical therapy' and 'back pain.' This revealed 2016 citations. Obviously this was much too broad; therefore we entered 'physical therapy and spondylolisthesis' to narrow the search. This revealed 38 citations. In an attempt to identify the highest level of research findings the search was limited to 'randomized controlled trials.' This yielded 3 articles.[10-12] The abstracts for each of these 3 articles were obtained by clicking on the authors' name. A quick review of each of these abstracts indicated that their results may be applicable to our patient.

Once the Research is Obtained it Should be Appraised

The goal of the initial, computerized literature search is to narrow down the number of articles and to allow the examiner to pick the best studies to review. A critical, next step in EBP is to judge the validity and strength of the conclusions from these articles. Those studies that have substantial methodologic flaws should not be considered. An excellent website to assist in determining the quality of randomized clinical trials is www.PEDro.fhs.usyd.edu.au. The PEDro website (physiotherapy evidence database) is an international, nonprofit endeavor housed at the University of Sydney.[13] It represents the largest, free database of controlled clinical trials, systematic reviews, and clinical guidelines related to physical therapy. It has posted reviews of many thousands of clinical trials and systematic reviews in physical therapy going back to 1929. In addition to its extensive listings, PEDro provides innovative search options that allow clinicians to identify relevant articles and reviews by any combination of author, diagnosis, body location, or treatment type. Each article has received a rating, based upon agreement of multiple examiners, that describes the quality of the study.

After obtaining the home page for PEDro and clicking the 'search command' followed by 'advanced search' each of the author's names from the 3 previously identified RCTs were entered. The study in question then appeared on the screen followed by a rating scale of 0/10 (lowest score for methodological quality) to 10/10 (highest score for methodological quality). Based upon this score one could determine which of the previously identified studies has the highest methodological quality. The article by O'Sullivan et al[11] received a 7/10 indicating that multiple reviewers had rated this study as having a high degree of methodological credibility. Moller et al[10] followed this at 6/10. The Spratt et al[12] study scored only 3/10 indicating serious limitations regarding the methodological quality. Considering this, the final search was narrowed to the articles by O'Sullivan et al[11] and Moller et al.[10] The full text of these 2 articles was then obtained by interlibrary loan.

Now Integrate the Appraisal of Literature with your Clinical Expertise and Experience, as well as the Patient's Values and Unique Circumstances

The next step was to determine the degree to which the findings of the 2 articles related to our specific patient, ie, their clinical usefulness. When reviewing the study by Moller et al[10] it was noted that although it was a 3-group randomized design (2 surgical and 1 "physiotherapy" group) the report was primarily focused upon comparing the 2 surgical groups while the physiotherapy intervention was not clearly described. Thus, although this study was rated reasonably high from the methodological perspective, its utility to assist in the nonoperative management of our patient was minimal.

In reviewing the study by O'Sullivan et al,[11] it was noted that the entry and exclusion criterion closely described our patient: between 16-49 years of age; recurring symptoms with the most recent of at least 3 months duration; radiographic evidence of spondylolisthesis or spondylolysis; and no history of lumbar surgery, psychiatric illness, or inflammatory disease. A 2-group RCT was performed with the interventions described as follows: in the first group subjects received weekly outpatient physical therapy for 10 weeks from physical therapists who were skilled in the specific exercise approach that was used. The specific exercise approach involved teaching the patient to contract the deep abdominal muscles using the 'abdominal drawing maneuver' and to coactivate these muscles with contraction of the lumbar multifidus muscles.A series of progressions toward increasing functional activities while performing these exercises was then described. In the second group subjects underwent a variety of treatments that were recommended by their respective medical practitioner. These included various combinations of swimming, walking, gym exercise, trunk strengthening exercise, heat, massage, and/or ultrasound. The authors reported that subjects in group 1 had significant improvements in pain (mean reduction from 5.9/10 to 1.9/10) and functional disability scores (Oswestry scores decreased from 29% to 15%) compared to initial scores, while group 2 had no significant improvement.

Given these data one could expect that for patients who are similar to the subjects studied and who receive the intervention as described for group 1,

there would be a high likelihood of measurable improvement in pain and function in 10 weeks compared to baseline or to a random assignment of the other treatments described. Because our patient fits the inclusion criterion and has goals that are similar to the outcome measures used in this study, if the treating therapist can reproduce the treatment described for group 1 this represents a useful application of these research findings.

Implement the Findings

Following the procedure described by O'Sullivan et al[11] for group 1, the therapist instructed the patient in performance of the specific stabilizing exercises and scheduled appointments to allow the dosage of exercise described. Care was taken to follow the protocol described within the study while carefully monitoring the patient response.

Finally, Assess the Outcome and Reappraise your Decision

A critical step in EBP is the use of valid, patient-orientated measures to assess outcome.[14,15] Upon completion of the intervention described by O'Sullivan et al,[11] the patient's outcome was assessed using the Oswestry Disability Index, a verbal rating scale (0-10) of 24-hour pain ranges and a patient-specific functional scale that related to specific goals.

DISCUSSION

This paper presents an example of one, relatively simple application of EBP in the orthopaedic physical therapy outpatient environment. To perform this procedure one needs internet access and a minimal amount of time. This process does not require advanced skills in research design or statistical analysis but relies upon the willingness of a practitioner to seek the best available research and to make reflective judgments regarding the appropriateness of this information relative to a specific patient.

Understanding the degree to which a measurement or treatment is supported by evidence is of vital importance to provide optimal patient care and to describe the role of physical therapy in the management of appropriate patients. Research evidence is the critical component in patient evaluation and classification and in the differentiation between effective and ineffective interventions. A critical task is the interfacing of research with the unique characteristics of the patient:therapist relationship.[16] DiFabio[7] submits that rather than using clinical research as a means to determine the 'absolute truth' we as a profession should use it as a means to develop a reasoned philosophy of care. The emphasis of clinical decision-making should be based upon the soundness of the rationale.

In some cases research that describes the effectiveness of an intervention for a given patient population has not been published in peer-reviewed journals. This does not necessarily imply that the intervention should not be used; however, in the absence of stronger evidence that supports a different intervention, one must rely upon clinical intuition while acknowledging a degree of uncertainty.

It is important to consider potential limitations with the procedure described in this paper. The literature search using PubMed.com may have missed some relevant papers. Thus, although we can defend the rationale for choosing the intervention described by O'Sullivan et al as being effective and safe when compared to random assignment of various other interventions, we can not conclude that there are no superior choices without performing an exhaustive search that includes other databases.

The use of EBP to assist in reflective clinical decision-making provides an important tool to clinicians. The growth of all medical professions relies upon a strong linkage between research and clinical judgment. Although not always easy EBP represents the best current model we have to achieve this.[2]

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Kaltenborn F, Evjenth O, Baldauf K, Kaltenborn T, Morgan D, Vollowitz E. *Manual Mobilization of the Joints: The Kaltenborn Method of Joint Examination and Treatment. Volume I: The Extremities.* 6th ed. Oslo, Norway: Olaf Norlis Bokhandel; 2002, 315 pp, illus.

Kaltenborn F, Evjenth O, Baldauf K, Kaltenborn T, Morgan D, Vollowitz E. *Manual Mobilization of the Joints – The Kaltenborn Method of Joint Examination and Treatment. Volume II, The Spine.* 4th ed. Oslo, Norway: Norli; 2003, 336 pp, illus.

The 2 updated editions of the Kaltenborn Method of Joint Examination and Treatment, Spine and Extremities, are student- and clinician-friendly with a spiral-bound soft cover design. The extremity edition is updated from 1999 and the spine edition is updated from 1996. The 2 books are almost identical in style and flow. After a descriptive introduction to the primary author, the books inform the reader what is new in these editions.

In the extremity edition, there are 4 additions to the text: advanced mobilization progressions outside the resting position, grades of translatoric movement, guidelines to reduce pain and inflammation and to relax muscles, and techniques for longer duration joint mobilization procedures.

In the spine edition, there are 5 additions to the book: progression of a manual technique from a test maneuver to an effective mobilization treatment, joint mobilization techniques outside the joint resting position, evaluation technique and more effective treatment planning, grades of translatoric movement, and basic manipulations that can be effective for both diagnosis and treatment.

The extremity edition is divided into 3 major sections. These include principles, technique, and appendix. The principles section is subdivided into 6 chapters. The primary topics covered are extremity joint movement, translatoric joint play, tests of function, orthopaedic manual therapy (OMT) evaluation, joint mobilization, and OMT treatment.

Throughout the principles section, the authors discuss anatomy, joint positioning, biomechanical theory, joint motion, quality and quantity of motion, manual therapy evaluation, and treatment. The authors do an excellent job of providing the reader with Kaltenborn's well-known convex-concave rule and the alternative glide test to assess restricted barriers. This detailed section is easy to follow for the novice clinician and very informative for an experienced practitioner. The chapters flow in a logical manner discussing all the elements of orthopaedic manual therapy evaluation and treatment, with an obvious Cyriax bias.

The second section covers all of the techniques for the upper and lower extremities. Each chapter includes functional anatomy and movement, examination, and specific manual procedures. Each chapter is anatomically tabbed for quick reference. All techniques described provide the reader with the objective, starting position, hand placement, and procedure. For every mobilization procedure, there is an associated picture illustrating hand placement for fixation and mobilization. These real-life photos are clear and easy to follow, placing an 'X' for the stabilizing hand and an '↓' for the mobilizing hand.

The final section is the appendix, which includes an upper and lower extremity joint and muscle chart. These charts display every muscle, the peripheral nerve innervation, the spinal cord root, and muscle action as primary or accessory function for each plane of motion. The last table describes each joint, its function, moving bone, and shape of surface.

The spine edition is also divided into 3 major sections: principles, technique, and appendix. The principles section is subdivided into 7 chapters including spinal movement, translatoric joint play, tests of function, OMT evaluation and treatment, spinal joint mobilization, and spinal syndromes. As in the extremity edition, the authors discuss the OMT Kaltenborn-Evjenth concept. They follow this with spinal motion, joint positioning, and the roll-glide relationship. This chapter provides the reader with Kaltenborn's sound biomechanical view of the spine.

The next group of chapters describes translatoric joint play using the Kaltenborn treatment plane, the convex-concave rule, and normal vs. abnormal grades of movement. The authors emphasize quality vs. quantity of motion, manual joint/tissue testing, elements of spinal evaluation and mobilizations, treatment techniques, and various spinal syndromes.

The spine is very complex in both evaluation and treatment. These principles, even though directed to both the novice and experienced clinician, may be too advanced for most entry-level clinicians. Some of the basic principles are easy to follow, but as we approach the technique section, the entry-level clinicians will need more training to be competent in the implementation of these procedures. The authors discuss this in the beginning of the technique section noting that it takes several years to master manual therapy. They follow this with a methodical flow of clinician and patient positioning, a variety of techniques, and documentation.

The technique section includes 7 chapters covering everything from the pelvis to the jaw and ribs. Each chapter describes functional anatomy and movement, evaluation and treatment of the respective region, tests, and mobilizations. The chapters are set up identically to the extremity book in that they cover objectives, starting position, hand placement, procedure, and author comments. Each chapter is tabbed with the region of the spine for easy reference.

In the spine edition, the photos are not as clear and easy to follow as in the extremity edition. Some of the pictures are blurry and distant. However, there are many pictures that show the technique both on a person and on a skeleton. This is helpful to more clearly understand hand placement and planes of motion. The use of symbols in the photos is helpful to see the stabilizing vs. mobilizing hand. The authors also include neural assessment, techniques, and a variety of testing procedures for all areas of the spine.

Freddy M. Kaltenborn is well known as one of the founding fathers of orthopaedic manual therapy within the PT profession. Fortunately, more entry-level curriculums have been incorporating OMT training into their programs. This is imperative in order for our profession to continue its evolution towards a doctorate degree. This set of books provides a very solid foundation for the biomechanical model of manual therapy. As previously noted, many of the spinal techniques will be too advanced for entry-level clinicians. However, there are numerous postgraduate continuing education courses that allow the entry-level practitioner to develop their skills. If the programs can dedicate more of their coursework to OMT evaluation and treatment, these books would be better used. I would cautiously recommend these texts, especially the spine edition, to entry-level programs. I would highly suggest these books to the experienced clinician that needs more guidance in OMT.

Cory B. Tovin, PT

Hardman AE, Stensel DJ. *Physical Activity and Health: The Evidence Explained*. Rutledge, London, 2003, 289 pp., illus.

This book is unique in a number of interesting and valuable ways. It approaches physical activity in an ecological way that highlights public health. It uses a definition of health that is broader than the typical western one of the absence of disease. It also uses a broad definition of physical activity as opposed to focusing on exercise. It is very user-friendly and readable. It is a great textbook for someone studying exercise physiology because of its ecological view and public health perspective, but would also be enjoyed by students of medicine, public health, allied health, and even education and health promotion. It is not, however, an introductory text. I have not come across a textbook that treats this subject from such a perspective. I think it is a view that is critical to battling the problems of obesity in the United States as well as other countries.

The book is divided into 3 parts. The first, called 'Assessing the Evidence,' deals with trends in physical activity, epidemiology, and assessing physical activity and health in epidemiological studies. This section also addresses the relationship in the literature between physical activity and mortality, and physical fitness and mortality. This section gives a brief but complete explanation of types of studies, error, and causality so that the reader can begin to read studies with an ability to evaluate the evidence.

Part two is titled, "Effects of Physical Activity on the Risk of Disease."The chapters in this section deal with specific health problems related to physical activity such as cardiovascular disease, cancer, Type II diabetes, and osteoporosis. What is great about this section is that it does not just deal with the effect of physical activity on their pathophysiology, but rather, the epidemiology of physical activity and disease including dose-response effects. The focus is what epidemiological research shows about the relationships among physical activity, fitness, and these diseases, from preventative and treatment perspectives.

The third and final section concerns a major trend: the aging population. Physical activity and exercise are discussed as both therapeutic and hazardous. Discussing the hazards of exercise, particularly for older adults or medically compromised populations, might be interpreted as discouraging, but it is important and a bold inclusion to the book.

Each chapter includes a list at the beginning of 'knowledge assumed' or what the reader needs to know to get the most out of the chapter. This reflects the idea that this is not an introductory text to Exercise Physiology but rather an introductory text to understanding the nature and quality of the evidence in the literature. With this list of concepts, readers can brush up on ideas before reading the chapter or research concepts at a later time.

Each chapter also includes a list of additional reading relating to the chapter, as well as study tasks or questions about the chapter. The additional readings reflect the global perspective of the book and the research evidence that it explains. This global, population perspective is the real strength of the book.

The disconnect between medicine and public health may contribute to the problems in the United States of sedentary lifestyle, overweight, and obesity. It is very unlikely that these problems can be solved one person at a time, as many have been trying to do. It is time that we examine health policy and develop interventions that are effective at a population level. Hopefully, this book and its ecological view will do much in this country to drive that process. In my opinion, our country will be healthier for it.

Allyson Baughman, PT

DeConinck SLH. *Orthopaedic Medicine Cyriax: Updated Value in Daily Practice. Part I: Clinical Examination and Diagnosis.* 2003, De Haan, Belgium. 283 pp., illus.

DeConinck SLH*: Orthopaedic Medicine Cyriax: Updated Value in Daily Practice. Part II: Treatment by Deep Transverse Massage, Mobilization, Manipulation and Traction*. 2003, De Haan, Belgium, 77 pp., illus.

Steven DeConinck's 2-part series is designed to provide the physical therapist with a comprehensive and systematic approach to the diagnosis and treatment of soft tissue lesions of the musculoskeletal system. Based on the diagnostic scheme and anatomical logic of Dr. James Cyriax, this series aims to enable the clinician to: (1) decide which questions to ask during a patient history, (2) identify the diagnostic consequences of the questions, (3) identify potential red flags, (4) perform a functional examination, (5) formulate a differential diagnosis, (6) create a treatment strategy and carry out appropriate interventions, and (7) interpret the expected prognosis pattern.

DeConinck's series is intended to represent an updated version of the Cyriax model based on the premise that "some views from the past have been abandoned and many others have been confirmed by research." In addition, some procedures described in this text have been optimized in order to become more user-friendly. References toward the McKenzie, Maitland, and Kaltenborn methods are interspersed throughout both texts.

Part I is dedicated to clinical examination and diagnosis, and begins with an in-depth review of Cyriax's principles of diagnosis. The chapters that follow are based on specific anatomical location and include titles such as Shoulder, Elbow, Wrist and Hand, Buttock, Hip, Knee, Leg and Foot, Lumbar Spine, Thorax and

Abdomen, and Cervical Spine. Each chapter is presented in an outline format and contains detailed information on the history, examination, interpretation of findings, differential diagnoses, and standardized assessment forms relevant to the specific body part. The author concludes each chapter with a case study and a 'recapitulation scheme'—a table that relates the physical examination findings to various differential diagnoses.

Part II is designed to provide the reader with a description of Cyriax-based treatment techniques, their indications, and contraindications. The book begins with an introduction to treatment principles. Chapter one describes the principles of treatment for muscular, tendinous, and ligamentous soft tissue lesions, and chapter 2 is dedicated to the principles of deep friction massage. Chapters 4 through 8 pertain to specific body parts such as the shoulder, elbow, wrist and hand, hip, knee, and leg and foot. The remaining chapters cover topics such as lumbar manipulation, lumbar traction, thoracic manipulation and deep friction, and cervical manipulation and deep friction.

I found these volumes to be valuable contributions to the literature. The author skillfully presents the material in a clear, concise, and easy-to-read format. Throughout the text he consistently provides examples in which to reinforce an understanding of the material. Of particular value was Part I's chapter on Cyriax's Principles of Examination. The information presented in this chapter forms the foundation for orthopaedic examination and diagnosis and should be appreciated by all physical therapy clinicians and students, regardless of whether or not they adopt Cyriax's treatment techniques. Other valuable contributions throughout the series included the abundance of illustrations, the standardized assessment forms, the recapitulation schemes, the case studies, and the clear manner in which treatment interventions, their indications, and contraindications were presented.

While this series should be recognized for its strengths, it did have a few minor shortcomings. Part I could have been more comprehensive to include examination of the joints above and below the symptomatic body part. For example, there was no mention of examination of hip strength for the patellofemoral patient, in spite of the recent research findings in this area. It should be noted though, that the emphasis of this book is on the Cyriax philosophy, which should provide the basis for the examination of musculoskeletal impairments. More comprehensive examination techniques for specific body parts can be found in other texts. I felt that another shortcoming of the book involved the illustrations in Part II. While they were plentiful, they could have been described in better detail in order to provide the reader with a clearer understanding of how to perform the techniques. Finally, in the shoulder case that was presented, the patient presented with pain on resisted shoulder medial rotation, yet the diagnosis was infraspinatus tendonitis. This is an apparent error, since according to Cyriax, pain on resisted medial rotation of the shoulder would lead to the diagnosis of subscapularis tendinitis.

The shortcomings that were described in this review should not diminish the value of this series. It is a valuable addition to the library of the physical therapy student, new graduate, or seasoned clinician. Steven DeConinck deserves praise for his ability to present such a well-written and useful guide to the Cyriax-based examination, diagnosis, and treatment of musculoskeletal impairments.

Phyllis Clapis, PT, DHSc, OCS

Tixa S. *Atlas of Palpatory Anatomy of Limbs and Trunk*. Teterboro, NJ: Icon Learning Systems; 2003, 426 pp, illus.

Serge Tixa, an anatomist at the Swiss School of Osteopathy, has written another excellent text that presents surface anatomy palpation of the limbs and trunk. This text is unique in that the author has included illustrations by Frank Netter, MD, along with palpation photographs and detailed script. The intended audiences are students and clinicians in fields where applied anatomy is utilized.

The atlas is organized into 12 sections based on body regions and includes over 700 photographs. The sections encompass: Cervical, Trunk and Sacrum, Shoulder, Arm, Elbow Forearm, Wrist and Hand, Hip, Thigh, Knee, Leg, and Ankle and Foot. Each section is subdivided into chapters that cover osteology, myology, arthrology (including ligaments), nerves, and vessels. Each section begins with Netter anatomic illustrations followed by 2 types of photographs. The first set of photographs is a more general image of the region while the latter set relates to what Tixa refers to as a "manual inspection of surface forms." This is a method that combines written text describing the palpation technique along with more specific photographs of the structures being palpated.

The strengths of this text and what sets it apart from many others, are the combination of anatomy illustrations, excellent photographs, and the written instruction that assists the reader in positioning the anatomical area and/or applying resistance to the structure to best bring it to view. Principles of resistive testing, palpation, and positioning are used in many instances. Nerve and vessel palpation are illustrated and described in reference to the location of other structures often including what structures may need to be gently moved in order to accurately perform the palpation. Ligamentous structures are often initially visualized in one photograph and illustration, and then positioned under tension for the best viewing and palpation.

I would recommend this text to students of physical therapy and clinicians in various practice settings where accurate palpation of anatomical structures is a valued skill. Both the novice and the experienced clinician will find the depth and breadth of this text useful in developing or refining their surface palaption slills.

Patricia A. Downey, PT, MS, OCS

(Editor's Corner continued from page 5)

so I hope you will seek out the references listed below. I think you will find the content enlightening.

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EDUCATION PROGRAM REPORT

Greetings from the Education Program Committee! We have been busy working on our schedule for CSM 2005 in New Orleans. At this time we are planning 3 pre-conference courses—Functional Manual Therapy for the Upper Quarter, Understanding the Biomechanics and Differential Diagnosis of Overuse Injuries to the Foot and Ankle, and Medical Screening for Physical Therapists. We also have great programming packed in for Thursday, Friday, and Saturday. We encourage everyone to come and enjoy networking and learning something new.

Ellen Hamilton, PT, OCS
Chair, Education Program Committee

PRACTICE COMMITTEE

My first order of business as the new chair is to recognize Steve McDavitt for his Practice Committee leadership over the last 6 years. His reports are legendary and Steve did a wonderful job of keeping us all abreast of activities related to this committee; so, there is no need to discuss the many successes this committee has experienced in recent times. Steve has spent a tremendous amount of time mentoring and preparing me for this position and I would like to thank him for his time as well as for leaving me with such an incredibly strong committee. Secondly, I would like to thank the members of the Practice Committee who have been serving and have agreed to continue serving on this committee. I am extremely honored to have the pleasure of working with the members of this committee who make up a who's who list of physical therapy practitioners. I am also pleased to introduce Debbie Todd who is a new member of the committee and a recent graduate who will bring a fresh and unique perspective to our discussions.

I would like to lay out the committee's agenda for the next few years. We would appreciate any comments and/or questions that you may have. One item that we have initiated and will continue to perform is a revision of the Manual Therapy Compendium since there is much new information that should be incorporated into this document. Another item will be to get the Practice Network back up and running. You will remember that the Orthopaedic Section created a mechanism for us to keep in touch with key contacts in each state component to disseminate and/or collect important information regarding orthopaedic practice. A new item that will begin this summer is the Practice Committee's annual meeting via conference call to discuss our annual goals and objectives.

I have been designated to be the Orthopaedic Section's designee for Reimbursement, State Governmental Affairs, and Federal Governmental Affairs. I will be attending APTA's annual meetings regarding each of these areas. We will provide you with periodic updates regarding each of these areas in terms of their relationship to orthopaedic physical therapists practice. I have also been assigned by the Orthopaedic Section Board to act as a liaison to the APTA POPTS Task Force and have been in frequent contact with Fran Welk who is Chair of this Task Force. We will be introducing a strategy for the Section to promote a decrease in the incidence of POPTS in the near future. To provide a preview, it will consist primarily of strategies to influence professional behaviors and practice patterns of physical therapy practitioners. We will work with the POPTS Task Force to develop documents as well as develop presentations regarding 'Autonomy in Orthopaedic Practice' that we are already planning to present at several meetings in late 2004 and throughout 2005. The final 'big ticket' item will be the development of an 'Orthopaedic Compendium for First Professional Physical Therapy Programs.' As you may be aware, many APTA Sections have created such documents to assist the first professional physical therapy programs with guidelines regarding practice patterns within their respective area of clinical practice. This will be an activity of the entire section, but we expect that the Practice Committee will take on a major component of this task. As always we will continue to work with members of the Section to handle issues that arise related to orthopaedic practice (AKA putting out fires).

Once again I am honored to serve as Chair of the Practice Committee. I look forward to serving and working closely with you over the next few years.

Bob Rowe, PT, DMT, MHS, FAAOMPT
Chair, Practice Committee

Webwatch

A new feature to inform readers of useful resources available on the internet

MedlinePlus®

http://medlineplus.gov/

This site contains an extensive amount of information from the world's largest medical library, the National Library of Medicine. There site carries no advertising and does not endorse any company or product. The content is authoritative and up to date with credible information on over 650 diseases and conditions. Other items include 1) lists of hospitals and physicians, 2) a medical encyclopedia and a medical dictionary, 3) health information in Spanish, 4) information on prescription and nonprescription drugs, 5) health information from the media, and 6) links to thousands of clinical trials. There is no advertising on this site, nor does MedlinePlus endorse any company or product.

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Emedicine.com is a Clinical Knowledge Database available to physicians and health professionals. Nearly 10,000 physician authors and editors are contributors to the site which contains articles on 7,000 diseases and disorders. The evidence-based content is updated 24/7 and includes the latest practice guidelines for 62 medical specialties. The professional content undergoes 4 levels of physician peer review plus an additional review by a PharmD.There is also a professional and institutional subscription site that can be found at: www.iMedicine.com. In addition a new consumer health site: www.eMedicineHealth.com houses more than 5500 pages of health content with articles written by physicians for patients and consumers. Peer review of each article is done by 2 physicians and a PharmD.

Have a website link you would like to share with our readers. Send link to cjh@nauticom.net

Section Members in the News

Association leaders, PTs, and PTAs gathered at a recognition ceremony during Annual Conference to honor and thank their colleagues for their contributions and commitment to practice, research, and education. Congratulations to the following Orthopaedic Section members who received honors:

HONORS

Catherine Worthingham Fellows:
Michael J. Mueller, PT, PhD, FAPTA
Robert W. Richardson, PT, MEd, FAPTA
Daniel L. Riddle, PT, PhD, FAPTA

AWARDS

Lucy Blair Service Award:
Nancy Nies Byl, PT, MPH, PhD, FAPTA
Aimee Beth Klein, PT, DPT, MS, OCS
Babette S. Sanders, PT, MS

Henry O. and Florence P. Kendall Practice Award:
Lucy J. Buckley, PT

Miriam Williams Award for Research in Physical Therapy:
Lynn Snyder-Mackler, PT, ScD, SCS, FAPTA

Dorothy Briggs Memorial Scientific Inquiry Award:
Linda Resnik, PT, PhD, OCS
Post Professional Doctoral

Chattanooga Research Award:
Guy G. Simoneau, PT, PhD, ATC
Joseph E. Berman, PT, MHS, ATC

Jack Walker Award:
Joseph A. Shrader, PT, CPed
Karen Lohmann Siegel, PT, MA

Dorothy E. Baethke-Eleanor J. Carlin Award for Excellence in Academic Teaching:
Kornelia Kulig, PT, PhD

Margaret L. Moore Award for Outstanding New Academic Faculty Member:
David M. Kietrys, PT, MS, OCS

Mary McMillan Scholarship Award:
Margaret S. Helkowski, SPT
Drexel University

 (Continued from page 6)

showing up and perfunctorily performing a 9-5 job. Sadly, most physical therapists are employed in this sort of system. Thus, physical therapists usually work for someone else. When working for someone else, physical therapists usually never have the opportunity to make any 'real' money; more importantly many never learn the importance of professionalism. How can we serve our profession if we are never given a chance to achieve our true potential? Who will care about our profession if we do not see the importance of professional growth? I see this as the most important change in the structure of physical therapy. Currently, I see little hope for our profession if we are not given the chance of improving ourselves and raising ourselves in rank. While the new DPT is raising our academic and intellectual level, we must also raise our rank in a professional level regardless of what we get paid. I want to see physical therapists working together in a collegial, respectful, and professional environment that appreciates the talents and abilities of each therapist.

Most who have read my previous President's Messages know that I am a history buff. I have been reading some of the important reasons why the medieval times were so dark and backward during the 5th to the 14th centuries. Many historians suggest the fall of the Western Roman Empire (in 476 AD) and the subsequent rise of the many European kingdoms as a primary reason. During the medieval times kingdoms or fiefdoms ruled Europe. Most men were vassals, serfs, or helots and were yoked to the land in loyal fealty and allegiance to their liege lord and could not escape this relationship. The occupation in which your father was employed was the same one that you also inherited. For years this closed system remained. During the time of the crusades, during the 12th and 13th century (1095-1295) many of the feudal lords were enticed by the pope to participate in the holy crusades. Unfortunately many knights were killed and never returned to their kingdom; however, as this door closed another one opened and gave freedom to all of the helots or serfs that were previously tied so strongly to the land. This release from fealty or bondage is what is thought to be one of the major driving forces for the European Renaissance. The new beginning! I believe that many physical therapists also must be released from their pecuniary and professional bondage. I would like to see the Private Practice Section work with the Orthopaedic Section and with APTA to promote un-fettered professional group practices. It may be hard for some of the very wealthy and powerful physical therapist(s) who own large group practices to relinquish their hold, but if there is a will there is a way. If we work on this I am sure we can develop a win-win for all. To me this is a first step in dealing with POPTS, let us get our own house in order, learn to act and behave as professionals, and then tackle POPTS straightaway with strength, confidence, and unity.

Orthopaedically yours,
Michael T. Cibulka,
PT, MHS, OCS
President, Orthopaedic Section, APTA, Inc.

Request for Research Proposals
Orthopaedic Section, American Physical Therapy Association

Purpose:
The Orthopaedic Section supports its members by funding studies to systematically examine orthopaedic practice issues. The purpose of this grant program is to address the urgent need for clinical research in orthopaedic physical therapy.

Targeted Recipients of the Grant Program:
The grant program is designed to provide funding to any Orthopaedic Section member who has the clinical resources to examine a well-defined clinical practice issue, but who needs some external funding to facilitate completion of the clinical research project.

Studies Eligible for Funding:
Four types of studies that will qualify for funding. They are studies that: 1) examine the effectiveness of a treatment approach on a well-defined sample of patients with orthopaedic problems; 2) examine patient classification procedures for the purposes of determining an appropriate treatment; 3) further establish the meaningfulness of an examination procedure and/or 4) examine the role of the orthopaedic physical therapist in the health care environment. Authors must state the purpose that their grant addresses.

Availability of Funding:
The Orthopaedic Section has earmarked $15,000 to be awarded to support clinical research that is relevant to orthopaedic physical therapy that addresses one of the four areas described above. Individual grant applications are limited to a maximum of $7,500 funding over a 1-year period. The grant may be used to purchase equipment, pay consultation fees, recruit patients or fund clinicians to collect data. Physical therapists receiving funding from this program will be expected to report their findings at a Combined Sections Meeting within 3 years of receipt of funding. Recipients will also receive $300 to assist with the costs for presentation of the work at a Combined Sections Meeting. Evidence of approval from the Institutional Review Board for Biomedical Research must be provided before the funding will be released.

Instructions for Submitting an Application:
Applications should include a 1 page abstract, a 10 page or less research plan, description of human subject issues and biosketches for all investigators.

The research plan should address the following in order:

- Specific aims
- Preliminary data
- Limitations and potential problems
- Background and significance
- Methods including data analysis plan
- Time for completion of project

The description of human subjects can be included beyond the 10 page limit for the research proposal and should address the following in order:

- Risks to human subjects including involvement and characteristics of human subjects, sources of research material and potential risks
- Adequacy of protection against risks including procedures for recruitment, informed consent and protection against risks
- Potential benefits of the proposed research to the subjects and others
- Importance of the knowledge to be gained

Biosketches for each investigator should be limited to 3 pages or less.

When formatting the application, margins in all directions must be at least 1/2 inch. The height of the letters must not be smaller than 10 point and the type density including characters and spaces must be no more than 15 characters per inch with no more than 6 lines of type within a vertical inch. Arial 12-point is the suggested font.

Criteria for Review of Applications:
Priority will be given to applications that meet the following criteria:

- Have a specific and well-designed purpose that is judged to be consistent with the types of research studies eligible for funding described above.
- The sample to be studied must include patients/clients with impairment of the musculoskeletal system. For studies examining the role of the orthopaedic physical therapist in the health care environment, the sample to be studied should include physical therapists involved in the delivery of orthopaedic physical therapy.
- Projects that involve multiple clinical sites.
- Projects that examine the effectiveness of orthopaedic physical therapy.
- Projects that are currently not receiving funding from other sources.
- Studies that have evidence of preliminary work.

Determination of the Award:
The deadline for submission of applications is November 15, 2004. Each application should include one original and six copies of all material. Members of the Orthopaedic Section Research Committee will review each proposal to determine if it is one of the four types of proposals eligible for funding and to determine if it includes a suitable subject population (i.e. patients with musculoskeletal impairment or physical therapists if the study examines the role of an orthopaedic physical therapist in the health care environment). Eligible applications will be forwarded to an external grant review committee that will review and rate each eligible application for scientific merit. The highest rated applications will be selected for funding. All applicants will be notified of the results by March 1, 2005.

To Submit an Application or Request Additional Information - contact:

Clinical Research Grant Program
Orthopaedic Section, APTA, Inc.
Attention: Jessica J. Hemenway
2920 East Ave. South, Suite 200
La Crosse, WI 54601
800-444-3982 x216 or 604-788-3965 x216
e-mail: jjhemenway@orthopt.org

Occupational Health Physical Therapists Special Interest Group

Orthopaedic Section, APTA, Inc.

Summer 2004 Volume 16, Number 3

Case Study: Onsite Physical Therapist Involvement in Correction of Ergonomic Problems in Circuit Box Assembly

Linda Nicoli PT, CEES, Workplace Wellness Services, Inc., Excelsior, MN

One of the joys of being an onsite physical therapist is being involved with the correction of an ergonomic hazard that effects not only your client, but her coworkers and future employees as well. As the onsite therapist at a manufacturing plant, I serve over 1000 employees involved in designing, manufacturing, repairing, selling, and distributing airline sensor systems. Working closely with the Occupational Health Nurse, I complete an average of 100 job site analyses per year. Many are as straightforward as correction of work practices. For immediate feedback, I use my Canon Optura Pi digital camcorder. Its large LCD display allows the employee to see the body mechanics or posture issue I am explaining. Before and after worksite videos reinforce the concept and give me a tool for explaining to a supervisor why a certain administrative control is needed. Single frame photos taken from the video on my iBook notebook computer are helpful when working with engineers on implementing tool or process revision. The following case study illustrates all 3 levels of controls and, fortunately, has resulted in safer employees and recognition for the ergonomic improvement team.

I first became aware of the problem in circuit box assembly in August 2003. An employee was returning to work after arthroplasty on her right thumb CMC joint. And she was having difficulty pulling circuit boards out of junction boxes when they were returned for repair or upgrading. As usual when an employee presents for physical therapy, a musculoskeletal examination was completed and treatment was initiated for pain in her shoulder, neck, and upper back. Unique to onsite physical therapy, when a worker's complaints are related to her job, a jobsite analysis also is done.

Figure 1

Figure 1 (R) illustrates a possible mechanism for upper quadrant stress. Her status post wrist arthroplasty was also a contributing factor because decreased ROM of her wrist resulted in awkward posturing of her shoulder.

Jobsite analysis is done using a modified version of the ANSI Z365 form[1] that we have adapted for communicating findings with the rest of the ergonomic team.

As can be seen from Table 1, ergonomic risk factors included awkward position of the right arm, use of the left hand as a fixture to stabilize the box as the board is removed, poor coupling with the latches holding the board in place and with the board inside the box, and excessive force necessary to pull the board due to expansion and/or corrosion that has occured with use.

Figure 2 illustrates the trial of controls to reduce the stressful use of both arms. The cake pan brings the box into a position where the right wrist and shoulder are kept in a neutral position during the pull and helps stabilize the box on the table.

We presented this picture to the supervisor who reported he had just fabricated a similar fixture for another process. He assigned the correction to an engineer and we continued working with the employee

Figure 2

to correct her shoulder impingement, stabilize her wrist and trunk, improve her endurance, and enhance knowledge of body mechanics and self advocacy when problems develop. She was discharged after 6 sessions with her shoulder pain resolved and independent in her home exercise program.

As happens too often in a busy clinic, we lost track of the employee once she

Risk Factor	<1 hr	1-4 hrs	>4 hrs	Cause of Risk Factor	Proposed Solution
REPETITIVE					
>15 times/min	0	1	3		
>20 times/hr	0	0	1	Gripping and pulling	Improve angle, coupling
LIFT (SEE NIOSH EQUATION)					
5-15 lbs.	0	0	1		
15-30 lbs.	1	1	2		
30-50 lbs.	2	2	3		
>50 lbs.(single lift risky)	3	3	3		
PUSH/PULL					
easy (employee rated)	0	0	1		
moderate	0	0	2		
heavy	1		3	Pulling/pushing cards 15-18 lbs. of force	Improve angle, coupling
CARRY >10 ft.					
5-15 lbs.	0	0	1		
15-30 lbs.	0	0	2		
>30 lbs.	1	1	3		
AWKWARD POSTURES					
neck, shoulder strain	0	1	2	Shoulder abducted >90	Improve angle of pull
extended reach	0	1	2		
forearm twisted	0	1	2		
wrist/hand bend/pinch	0	1	2	Gripping latches, cards holding box with L fixture to hold box steady	Improve coupling with R,
trunk: twist/bend	0	1		2	
knee: squat/kneel	0	1	2		
USE POWER TOOLS	0	1	2		
PRESSURE POINTS	0	1	2		
SAME POSITION	0	1	2	Standing long periods	Anti - fatigue mats, alternate sit/stand
ENVIRONMENTAL	0	1	2		
KEYBOARD USE	0	1	2		
NO CONTROL OF PACE	0	1	2		
Sub-totals		1	3	0	
Total Score >10= RISK		4			
Dept. XXXXXX			Date 10/02/03		Evaluated by: Linda Nicoli

was discharged from therapy. Her supervisor was reassigned to another department and progress on the fixture halted. An unwelcome realization of this situation occured in February 2004 when the employee went on vacation. Her coworker presented in the nurse's office with shoulder symptoms when she had to do double duty pulling boards. We went to the new supervisor with our pictures and recommendations. This resulted in immediate action. Within a month, the fixture was in place.

(Figure 3) Latches hold the box in the fixture at an angle which promotes good alignment of the shoulders and wrists and allows the instrument builder to use her body weight to assist with pushing and pulling the boards.

Better yet, the engineer involved had also devised a tool to grab the board (Figure 4) and designed a tool to open the latches. The tool was built in the machine shop and the fixture was installed by the maintainence staff. The engineer estimated the project required about 6 hours of time at $60 to $70 per hour and installation took less than 30 minutes. Materials cost another $80, bringing the total cost of the revision to approximately $500. The long-term cost savings in preventing injury and improved productivity easily justify the expense and effort.

Figure 3

Figure 4

We maintain an ergonomics page on the company's website including before and after pictures of our ergonomic successes to reward those whose advocacy, creativity, and support are making work safer and more enjoyable and to inspire others to report problems as soon as they are identified. The website also contains video clips of ergonomic chair adjustment and microscope use filmed onsite with employee volunteers. Several factors are essential to success in similar situations.

A professional with knowledge of human factors in manufacturing processes. Physical therapists with their knowledge of musculoskeletal biomechanics and human behavior sciences are uniquely qualified for this essential component.

Access to engineers for changes to tools and/or processes.

Support from administration – access to data, disruption of work for analysis, training and trial of controls, financing engineering controls—on all levels.

A corporate culture which permits employees to report ergonomic risks or musculoskeletal problems which may be work related without fear of retribution.

In this case, all those factors came together, resulting in happier workers, supervisors, an occupational health nurse, and an onsite physical therapist.

REFERENCE

1. *The ANSI Z-365 Risk Factor Checklist, Proactive Job Survey and Pyschophysical Tables:* National Safety Council, Draft Propsed Standard on Cumulative Trauma Disorders. 1998.

APTA Hosts Busy Hotline At PT '04!

The APTA Section on Orthopaedics and the APTA Sports Section co-hosted a hotline called, "Taking Care of Your Knees," on Friday, July 2. Twenty-four physical therapist volunteers answered a total of 163 calls from consumers across the country. Ages of callers ranged from 14 to 95, with the most common age being 47. Callers spoke with physical therapists about a wide variety of conditions ranging from general knee pain, arthritis, knee pain following injury or surgery, and prevention. Information about the hotline appeared in USAToday.com, Chicago Tribune, Kansas City Star, San Diego Union Tribune, Houston Chronicle, and The Los Angeles Daily News, among others. APTA would like to give special thanks to the volunteers who made the hotline such a success!

FOOT & ANKLE

SPECIAL INTEREST GROUP

PRESIDENT'S REPORT

In order to start off on the right foot as the new president of the FASIG, I must first thank Steve Reischl for his efforts over the past 3 years in this position. His leadership, endless work ethic, and unparalleled knowledge of the foot and ankle permitted our SIG to grow and prosper in numerous ways. This included a significant growth of our membership, development of the 'Find a Foot and Ankle PT' web listing, completing an extensive survey of our membership's knowledge base, and over-seeing many of the recent and highly successful education programs which included the Research Retreat in May. Thank you Steve for your excellent vision and endless efforts.

Despite that our membership has grown, we are sadly lacking input and attendance at the annual Combined Section' Meetings. This is an excellent forum where you, the member, can give your feedback on the CSM and other Foot and Ankle education programming and strategic planning. After all a Special Interest Group is trying to take into account all of your interests in this specialized area of Physical Therapy. Further, it is not just limited to only Orthopaedic Section members as can be seen by our eclectic CSM presentations which cover aging, pediatrics, and sports aspects related to the foot. Next year's program will again be diversified. We will also host a preconference course (more information pertaining to this will follow).

Some of the goals our group wishes to attain over the next few years includes further development of liaison with other Foot and Ankle professionals including: American Orthopedic Foot and Ankle Surgeons and the Podiatrists. Establishment of entry-level PT foot and ankle curricula in PT schools nationally, and obtaining the criteria which may discern a foot and ankle 'specialist' within our profession. Currently, several other SIGs are pursuing certification in their respective area of expertise. This is a controversial topic amongst those who do attend the FASIG Business Meetings. I would like to hear from the membership regarding their ideas and feelings on this matter.

I look forward to my tenure as the President of this SIG and hope that it can work for you, the PT with a special interest in the foot and ankle. We should be able to get a leg up on the other SIGs with your input.

Steve Paulseth, PT

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FOOT & ANKLE SPECIAL INTEREST GROUP
Business Meeting
APTA Combined Sections Meeting
Nashville, TN
February 6, 2004

Stephen Reischl, President, called the Foot & Ankle Special Interest Group (FASIG) Business Meeting to order at 5:09 pm on February 6, 2004. The meeting was held at the Opryland Hotel, Nashville, TN.

MOTION: It was moved by Lisa Selby-Silverstein to adopt the minutes from the February 14, 2003 meeting of the FASIG Business Meeting. Tom McPoil seconded the motion. The minutes were unanimously approved following an amendment that Mike Cornwall be changed to Mark Cornwall.

REPORTS:

Chair. Steve Reischl encouraged all members to enroll and use the 'Find a Foot and Ankle Physical Therapist (FAPT)' on the Orthopaedic Section web site (http://www.orthopt.org/).

Vice-Chair. Steve Paulseth thanked those who assisted with this year's programming and asked for suggestions regarding future topics. The membership expressed the desire to have next year focused on the diabetic foot.

Secretary/Treasurer. Mark Cornwall reported that the budget from the Orthopaedic Section remains at $6,000.00, which is ade-

quate for the operation of the SIG. It was also reported that approximately $9,000.00 was made by the SIG at the preconference course held in Tampa last year. This money goes into a discretionary fund that can be used for special projects of interest to the membership.

Research Committee. Irene McClay-Davis provided an update on the research retreat to be held in Southern California from April 30 to May 1, 2004. The keynote speakers for this retreat will be Neil Sharkey from Pennsylvania State University and Arne Lundberg from the Karolinska Institute, Sweden. The topic for the conference will "Measuring Foot Motion: Forward and Inverse Dynamics." All individuals interested in attending are encouraged to do so.

It was suggested by the membership that the Research Committee investigate the mechanism and procedure for submitting foot and ankle related articles to the 'Hooked on Evidence' web site. Submitted articles would be weighted toward intervention rather than evaluation or anatomy.

ELECTIONS:

Tom McPoil, as chair of the Nominating Committee presented the ballot for this year's elections. They were Steve Paulseth for Chair, Cheryl Mauer for Vice Chair, and Mark Cornwall for Secretary/Treasurer. Byron Russell agreed to run as a write-in candidate for the Nominating Committee.

OLD BUSINESS:

Discussion continued on the procedure and need to develop criteria for defining a foot and ankle specialist. A suggestion was made to survey the membership again about their foot and ankle practice and if they consider themselves a specialist and why. Nancy Henderson and Steve Paulseth agreed to work on the development of the survey.

NEW BUSINESS:

Steve Reischl asked if there was interest in conducting another preconference course that would be held at the next Combined Sections Meeting in New Orleans. The topic of Orthotic Fabrication was suggested.

ELECTION RESULTS:

Tom McPoil presented the results of the election. They were:

•Steve Paulseth	Chair	2004 - 2007
•Cheryl Mauer	Vice Chair	2004 - 2006
•Mark Cornwall	Secretary/Treasurer	2004 – 2007
•Byron Russell	Nominating Committee	2004 - 2007

MOTION: It was moved by Tom McPoil to adjourn the meeting until February 2005 in New Orleans. Byron Russell seconded the motion. The motion passed and the meeting was adjourned at 6:11pm.

Respectfully Submitted by,
Mark W. Cornwall, PT, PhD, CPed
FASIG Secretary/Treasurer

Performing Arts Special Interest Group • Orthopaedic Section, APTA

PRESIDENT'S MESSAGE

Greetings!

Summer is upon us and I hope everyone's plans are shaping up. Planning for CSM 2005 in New Orleans is an ongoing process. Our Vice President and Education Chair, Tara Jo Manal, is busy creating more focused programming that will incorporate competencies from our Description of Advanced Clinical Practice (DACP). I believe that you will appreciate better how the DACP can direct our programming efforts this coming CSM. Your executive board has bantered around several topics that we feel are important to cover and you can be assured of comprehensive topic coverage. We will begin the task of planning for future curriculum direction as we complete our current programming. Since any planning is a work in progress, we want and need your feedback. Plan now to join your colleagues in New Orleans and participate in PASIG activities.

We have once again modified our mission statement and have proposed a vision statement in order to stay focused on the goals of our special interest group while planning for future activities. These statements have been sent to our Strategic Planning Committee for their input and will then go to the Orthopaedic Section for their approval. Look for these on our website when they're available.

Offering a student scholarship was proposed during the Business Meeting at CSM in Nashville. The executive board has agreed upon a few guidelines for this new idea from our group. Adrienne McAuley has headed up this endeavor and can be contacted at mcauley_pt@msn.com if you, your colleagues, or your school would like more information.

PASIG's Actor's Equity involvement has gone through a few changes. Shaw Bronner, Marshall Hagins and I met once again this May with Actor's Equity and the Broadway Producer's League while they were in contract negotiations. Suffice it to say that our presentation was well received and I am sending a summary report of our meetings in New York to the Orthopaedic Section Board of Directors. For those of you wanting more information than I've briefly given here, please contact me directly.

As usual, we have only a few folks nominated to fill upcoming executive board and elected committee positions. Shaw Bronner and her nominations committee continue to solicit anyone interested in serving within the PASIG. This is a great way to keep involved and to get to know many of your fellow PASIG members. We are only as good as our membership's involvement.

For those of you who have been actively participating, let me offer a genuine and heartfelt "thank you" from your executive board. For those just getting started, find a mentor within our group and get your feet wet. There is much to be done and as you may have heard before, "Many hands make light work!" That is all for now, so enjoy the summer and all of my best to each of you.

Jeffrey T. Stenback, PT, OCS
President, PASIG

PUBLIC RELATIONS AND SERVICE

One of the areas in which the PASIG members can make an invaluable contribution is in the area of education. The performing arts population, both professional and student dancer and dance parent, frequently lack information about wellness, lifestyle, risks, etc. There are many avenues to reach them with valuable information, including the development of guidelines about topics of interest and writing article disseminated in their journals. The publisher of several dance magazines is very interested in contributions from physical therapists. Topics of interest to them range from nutrition, cross training, to prevention tips and technique errors. I am compiling a list of magazines. Please contact me with suggestions or for further information.

Shaw Bronner, PT, MHS, EdM, OCS
Analysis of Dance and Movement (ADAM) Center
at Long Island University
sbronner@liu.edu

OPPORTUNITIES IN THE PERFORMING ARTS FOR STUDENT PHYSICAL THERAPISTS

I. Clinical Affiliations.

Student Physical Therapists who are interested in performing arts clinical affiliations can find a list of participating sites on the PASIG website: http://www.orthopt.org/sigs/performing_arts_sig/.

Generally, most require the affiliation to be in the last year, following a previous orthopaedic rotation. Some offer

full-time clinical and others offer a mix of clinical and research opportunities. Opportunities also exist to add an additional affiliation postgraduation.

II. Research.

Student Physical Therapists who are interested in conducting research in the performing arts can contact the PASIG Research Committee for mentorship. There are also scholarships and awards for research conducted in this area. These include the following organizations:

(a) Beginning in 2005, the PASIG is initiating a new scholarship for performing arts research conducted by PT and PTA students. Abstracts must be submitted to the Orthopaedic Section for CSM (deadline July 2005). If the abstract is accepted, the PASIG scholarship application deadline is in November 2005. Please contact Adrienne McAuley PT, OCS mcauley_pt@msn.com for more information.

(b) The Performing Arts Medical Association (PAMA) is a multidisciplinary international organization dedicated to improving the healthcare and treatment of performing artists through education, research, and teaching. PAMA sponsors a "Young Investigator Award." Their conference "Medical Problems of Musicians and Dancers" is held in June in Aspen, Colorado. Generally, abstracts and submissions are due in November and notification is in January. Their website has more information: http://www.artsmed.org

(c) The International Association of Dance Medicine and Science (IADMS) is a multidisciplinary international organization created to serve as a forum for education, promotion of research, and public service in the field of dance medicine and science. Organization. IADMS has a student research award and student travel grant. Generally, submissions are in March, notification in August, for the conference which is held in October. Conferences alternate between the United States and in other countries on alternate years. For more information go to: http://www.iadms.org/student-award.html

III. Education.

The APTA Combined Sections Meeting PASIG programming is an invaluable educational experience to those interested in diverse topics such as instrument modifications, evaluation of musicians playing specific instruments, and in-house professional dance programs.

The PASIG also sponsors continuing education programs. Watch for announcements about the next offering of our "Introduction to Dance Medicine" course.

Shaw Bronner, PT, MHS, EdM, OCS

PRACTICE COMMITTEE REPORT

The results of the Description of Advanced Clinical Practice (DACP) for Physical Therapists treating Performing Artists was completed this spring and presented at CSM 2004. The DACP is already being used by the PASIG to help formulate future CSM programming. In order to spread the word regarding this document and its potential uses, Jennifer Gamboa, Tara Jo Manal, and Marshall Hagins will present the results of this study at the International Association of Dance Medicine and Science, in San Francisco on October 14-17, 2004.

PASIG NOMINATING COMMITTEE: CALL FOR NOMINATIONS

The PASIG invites you to submit your name or that of a willing candidate to run for office. Help to contribute and learn about the performing arts by serving. The following positions are open for nomination: President, Treasurer, and Nominating Committee member. Each position is for a 3-year term. This is a great way to get involved and meet wonderful people from across the country. We hope some of you will step forward! We have listed the various duties for each position below.

PASIG President

Duties:

- Serves as the official head of and public spokesperson for the PASIG.
- Presides over all meetings of the PASIG and the Executive Board.
- Is an ex-officio member of all committees except the Nominating Committee.
- Acts as a neutral member of the PASIG in voting matters.
- Exercises the right to vote to resolve a tie vote.
- Is liaison to the Orthopaedic Section.
- Attends the Orthopaedic Section Board of Directors meetings at CSM and the Fall Meeting (to be reviewed annually based on Section finances).

Additional Responsibilities:

- Appoints PASIG chairs and members of standing committees and, as necessary, appoints special committees.
- Directs PASIG-related correspondences to appropriate individuals within the SIG.
- Sends copies of appropriate PASIG-related correspondence to the Orthopaedic Section office.
- Compiles the agendas for all meetings.
- Provides for the orientation of all new officers and chairs.
- Attends the following meetings: PASIG Executive Board Meetings and conference calls, PASIG Annual Business Meeting at CSM.
- Submits progress reports and other pertinent materials to the Orthopaedic Section office by the deadlines specified in the Section calendar (eg, submits the PASIG goals/objectives updates to the Section quarterly).
- Attends APTA meetings in which the President is required to represent the PASIG.
- Extracts relevant information from the minutes of the Orthopaedic Section and APTA meetings and distributes them to appropriate individuals.
- Responds to requests from the APTA and its components, sharing information with the Executive Board as indicated.

PASIG Treasurer

Duties:

- Assumes responsibility for submitting the PASIG budget by deadlines determined by the Orthopaedic Section each year.

- Assumes responsibility for the receipt, disbursement, and accurate recording of all PASIG funds.
- Presents a written financial report at the PASIG Annual Business Meeting and at Executive Board Meetings.

Additional Responsibilities:

- Serves as a voting member of the Executive Board.
- Serves as liaison to the Section Treasurer and Finance Committee.
- Distributes quarterly budget reports to the Executive Board via the Section office.
- Attends the following meetings: PASIG Executive Board Meetings and conference calls, PASIG Annual Business Meeting at CSM.
- Presents an updated budget proposal for the finance committee prior to deadlines determined by the Orthopaedic Section each year.
- Forwards copies of official correspondence to the President and to the Section's Program Coordinator.
- Maintains a copy of annual and quarterly budget reports for use in assisting the President in the orientation of the successor to the office of Treasurer.
- Other duties as assigned by the President.

Nominating Committee Member

Duties:

- Is responsible directly to the membership.
- The senior member of the Committee becomes its Chair.

Additional Responsibilities:

- Carries out or supervises the carrying out of the Policies and Procedures for elections via mail ballot and works with the Orthopaedic Section office on coordinating this project.
- Prepares a slate of candidates for each PASIG election that is submitted to the Executive Board 4 months prior to the CSM Business Meeting.

Guidelines: Nominees must be PASIG and Orthopaedic Section members. Nominees must give their consent to be nominated before their names are put forward. Nominees may be self-nominated. Upon agreeing to be nominated, nominees will be asked to write a short biography and a position statement regarding their ideas and role as an officer in the PASIG.

Please contact any of us with your nominations:

Shaw Bronner PT, MHS, EdM, OCS
Nominating Committee Chair
Email: sbronner@liu.edu

Gayanne Grossman PT
Nominating Committee
E-mail: Gngrossman@aol.com

Karen Hamill PT
Nominating Committee
E-mail: dancingkaren@hotmail.com

TREASURER'S REPORT

The 2005 budget has been submitted to the Orthopaedic Section. Our reception at CSM 2004 was such a great success that the Board has planned to fund another reception for CSM 2005. I am very excited that the PASIG will be entering 2005 with a solid foundation from which we can better finance our efforts to promote education, research, and clinical expertise.

CSM SCHOLARSHIP

The Committee members worked hard to investigate Jennifer Gamboa's recommendation to sponsor a student to CSM. With their invaluable assistance and the input of the Board, it has been decided that the PASIG will award $400 to a student member who presents a poster or platform presentation concerning performing arts.

Official notification will be sent to students and schools at the start of the Fall semester 2004. Submissions to be considered for CSM 2006 are due in July 2005. Questions can be directed to Adrienne McAuley at mcauley_pt@msn.com. Thank you.

CSM MEMBERSHIP SURVEY RESULTS

Here are the Results from the "Survey for Performing Arts SIG – CSM 2004"

There were 22 surveys returned.

1) 13 were current PASIG members and 9 were nonmembers
2) all 9 expressed interest in joining
3) 12 attended the preconference course on Dance Medicine
4) all 12 reported that they would attend another PASIG preconference course, 2 of the respondents not attending said they would not attend a future preconference course due to time and money, and 1 said they would attend if the topic was of interest
5) 19 of 22 attended the PASIG general programming with 17 participants scoring the content and well-roundedness of the programming at 8/10 or higher, 2 responses were average of 6/10
6) Subject matter to be considered for future programming was as follows:
   - ~Musician related topics – including specific related pathologies at the impairment level; specific muscle group recruited for specific instruments
   - ~Full course on musical instrument specific issues (very much like the interactive section of the programming); psychology of treating musicians and general treatment of all musicians (common problems)
   - ~Musician/Dance functional taping; manual therapy for injuries
   - ~Dance related injuries/treatment for collegiate dancers and private/studio adolescents; screening for adolescent dancers; different types of dance shoes; longer course on Dance Medicine with increased time for intervention
   - ~Injury collection for research data
   - ~Figure skating, ice dancing, and gymnastic mechanics and injuries
   - ~Back stage emergency issues and evaluation
   - ~Panel discussion for tips in getting started with performing artists

MEMBERSHIP COMMITTEE REPORT

The Membership Committee has completed the new Membership Directory and it is available by contacting the

Orthopaedic Section at www.orthopt.org. There are some unique features that have been added to the directory with the addition of 2 indicies by last name and by state. This was done at the request of membership to help improve locating PTs by name or by state.

Please continue to send all updated information to Susan Clinton, PT, MHS at sclint@lsuhsc.edu or to Tara Fredrickson at the Orthopaedic Section office at tfred@orthopt.org.

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Pain MANAGEMENT

SPECIAL INTEREST GROUP • ORTHOPAEDIC SECTION, APTA, INC.

PRESIDENT'S MESSAGE

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

As our adult population grows older (65 or higher) and lives longer, it is estimated that 35% or 50 million people are either partially or totally disabled due to chronic pain. Chronic disease is also on the rise with an estimated 105 million with some type of chronic disease at an annual cost of $500 billion a year. It is estimated that by the year 2010, 120 million will be affected with chronic disease.

With the tremendous rise in both chronic pain and illness in general, it is imperative that the therapists sharpen their skills and knowledge in the area of addressing this population. Therapy will be more and more in demand with fewer trained to address this growing populace. It is critical that we grow in our knowledge of how to address these individuals, as we will be the main source to provide care to them.

On a lighter note, I wish to thank Sandi Pomeroy for updating our Pain Management web site found at orthopt.org. I would suggest that you read her article and go to view the new information posted. Any additions are surely welcome and can be addressed to her directly. Thanks Sandy for a job well done and for all your hard work.

I hope you all have a wonderful summer and again if you have anything to contribute, please send it to me so that we can add it to the fall copy.

INFORMATION CORNER

Sandi Pomeroy, PT

The Pain Management SIG is trying to give members a new reason to visit their area of the Orthopaedic Section website. We are now in the process of updating the information available to you.

Up to now you could access the usual Directory of Officers with their email addresses and the minutes of the Section. By the time this goes to print, we will have added some practical information that we hope will be useful to the clinical physical therapist interested in pain management on a daily basis.

The first additions will be links to relevant sites and pain definitions. Then we will make it much easier to get to past Pain Management columns from *Orthopaedic Physical Therapy Practice* if you are looking for information on Low Level Cold Laser, Reflex Releases‰, the most recent Power Plate‰, or past messages from the President.

We are also adding a regular hints and tips column to stimulate recent graduates to take an interest in pain patients. We are beginning with that very basic practical information that may or may not have been specifically covered in other coursework. It is designed to help the beginning therapist in working more successfully with pain patients. It will certainly evolve according to the needs of the Pain Management SIG but will start with a feature called Positions of Comfort. This will be a 3-part series on how to instruct a patient in comfortable positions of support. Part 1 is Pillow Talk: How to Evaluate and Instruct Patients in Pillows. Part 2 is positions of comfort for sitting, and Part 3 is for sleeping. A preview for part 3 is the use of abdominal wedges (similar to those used by pregnant women) and a discussion of the reasons why so many people sleep half way on their sides and half way on their stomachs causing rotation to their low backs all night. Measurements of the wedges for low back pain will be shared and instructions on how to make or obtain the wedges will be included. If there is enough interest, downloadable patient handouts may be added. The column will then focus on physical therapists sharing unique solutions to problems that may benefit other therapists and patients.

We hope to make the web site more user friendly with information helpful to Section members and encourage more participation and information sharing within the membership. We welcome your ideas and suggestions to improve the site as well. If you have suggestions, please contact the Orthopaedic Section office at tfred@orthopt.org.

A complete SIG Board listing can be located on our website at orthopt.org

Animal Physical Therapist

SPECIAL INTEREST GROUP

Orthopaedic Section, APTA, Inc.

THE ANIMAL PHYSICAL THERAPIST SPECIAL INTEREST GROUP (ANIMAL SIG) UPDATE:

1. Proceedings of the 2nd International Symposium for Rehabilitation and Physical Therapy in Veterinary Medicine – August 2002, Knoxville, TN. Available now for $20. They are a great resource. Contact David Levine at david-levine@utc.edu.
2. Orthopaedic Section Member and Non- member directories are available through the Section Office 800-444-3982 ext 203, Fax: 608-788-3965, or E-mail: tfred@orthopt.org . There currently are 544 members.
3. State Liaisons: To date there are 33 states that have Animal SIG Liaisons. Contact Charles Evans at chazzzevans@netscape.net for more information.
4. The APTA has a web site that lists all of the State Practice Acts: www.apta.org/advocacy/state/state-practice.
5. If you would like to have your clinic listed on the Animal Physical Therapy SIG website, please contact Debbie Gross Saunders at WizofPaws@aol.com.

ANIMALS AS MEMBERS OF THE HUMAN HEALTH TEAM

Brad Jackson, PT, MS

The Eden Alternative, a popular organizational philosophy for nursing centers, encourages animals to live within the facility to facilitate regular interactions with residents. A large number of hospitals, such as the National Institutes of Health and the Mayo Clinics Saint Mary's Hospital provide animal visits (animal-assisted- activity) and animal facilitated therapy (animal-assisted-therapy, AAT) services for their patients.

The human-animal bond and its positive effects on human health have been recorded anecdotally for hundreds of years and recent analytical research studies suggest positive physiologic and psychological benefits when animals interact with human health care patients receiving therapeutic services. Positive physiological and psychological benefits have been found when patients have the opportunity to interact with animals (Allen, 2001; Barker & Dawson, 1998; Beck, 2001; Hart, 2000, Marr, et al. 2000; McNicholas, Collis, Kent, et al., 2001; Walsh, Mertin, Verlander & Pollard, 1995). Contact with animals reduces blood pressure and heart rate in patients in the intensive care unit and lowers cortisol levels in anxious patients (Barba, 1995; Cole & Gawlinski, 1995; Nagengast, Baum, & Megel, 1997; Odendaal, 1999). Older adults who are in long-term care isolate themselves less and are less depressed when visited on a regular basis by a friendly dog (Fine, 2000). Patients treated for disorders of communication have demonstrated benefits from AAT (Harbour & Kahn, 2002; Mosier & Kahn, 2000). The AAT sessions were shown to decrease loneliness among residents of long-term care facilities.

Professional publications and coursework, such as Delta Society's Animal-Assisted-Therapy Applications 1 Course, have been developed to educate health care professionals about AAT. The increasing prevalence of animals in human health care has lead leaders in the field to establish of standards of practice so AAT can be delivered effectively, efficiently, and safely (Delta Society, 1996). Involvement of animals with people raises the concern of infectious disease and biting and/or scratching. However, healthy, domesticated animals, free of internal and external parasites, and with current vaccinations, pose minimal infection risk to humans, even those who are immunocompromised (Centers for Disease Control website; American Veterinary Medical Association website). Safety screening programs that exam animal and handler behavioral safety, and are specific to animals in health care settings, have been developed. Delta Society's Pet Partners Program comprehensively evaluates both the animal and its owner/handler.

Universal utilization of AAT could enhance the treatment offerings of the 7.5 million healthcare professionals currently practicing worldwide. It is estimated that as few as 1% of these healthcare professionals have the ability to provide AAT treatment. What can you do to bring animal assisted therapy to your patients?

1. Visit Delta Society's website at www.deltasociety.org.
2. Read from the reference list below.
3. Talk with health care professionals already involved in animal assisted therapy.
4. Attend Delta Society's National Conference, which is held in May of each year.
5. Read Brad's lecture, An Introduction to Animal Assisted Therapy, can be found at the American Physical Therapy Association website (www.apta.org).

If you have further questions about animals in human health care, feel free to email Brad Jackson: umdtp@chartermi.net

CALENDAR OF EVENTS

- The home study course BASIC SCIENCE FOR ANIMAL PHYSICAL THERAPISTS is still available. Contact 800-444-3982 x 216 or 608-788-3982 x 216 for more information.

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16. Pet Partners Information, Organizational Information, and Animal Assisted Therapy Information. *Delta Society Website*. Available at: http://www.deltasociety.org. Accessed April 22, 2002.
17. Preventing Infections from Pets–a guide to individuals with HIV. *Centers for Disease Control Website.* Available at: http://www.cdc.gov/hiv/pubs/brochure/oi_pets.htm. Accessed May 2, 2002.

Over the course of several years Brad Jackson noticed the positive effect his Chocolate Labrador Retriever *Boomer* had on friends and family. Smiles, excitement, and fun were the norm. When Brad finished his Masters Degree in Physical Therapy in 1994, it was only natural to give Boomer a chance to work with patients at the local hospital where he was employed. Boomer's tail wagging therapy was a huge success. Upon moving to Marquette, Michigan in 1996, Brad decided a community organization was needed to foster the integration of dogs into health care settings. He founded the Upper Michigan Dog Therapy Partnership in 1997 and serves as the organizations Executive Director. Brad has 8 years of clinical experience treating physical therapy patients with animal assisted therapy (AAT). Brad assisted in writing an instructional course, *AAT Applications 1,* which focuses on the education of health care professionals to effectively utilize AAT, and has presented this course to over 100 people. He has spoken on the subject of AAT at national and regional conferences. Brad is highly involved in AAT research through his collaborative work with Northern Michigan University's Communications Disorders Department. Brad's professional goal is to play a role in the mainstreaming AAT into the medical model guiding the United States health care system.

MESSAGE FROM THE VICE PRESIDENT

Steve Strunk, PT

Dear Animal Physical Therapist Special Interest Group (APT SIG) members:

Since most APT SIG members have no idea who the new VP is, a brief background seems in order. Those I have met, either at the 1st or 2nd International Symposia, the Orthopaedic Section sponsored "Equine 1" and "Canine 1" courses or elsewhere, may also wish to know more about my involvement with PT for animals. Most importantly, to describe my experiences in order to determine how I can best contribute to the APT SIG and serve you, the SIG members.

My first experiences with what I would later know as physical therapy came as a teenager treating my own family's and neighbor's pets. These interventions included wound care, massage, range of motion, stretching, other manual techniques, and exercise. When I became educated as a PT, my knowledge became much more sophisticated and advanced with these and other realms of human physical therapy. Adapting this knowledge for animal applications became extremely valuable in managing the myriad injuries and chronic degenerative conditions of my dog.

In 1995, a friend who is a dog breeder and trainer approached me with a business proposition. This friend knew of my experience and stated he and his veterinarian wanted to start a small animal rehabilitation facility where I would be the working partner. A building was available and plans were made for extensive remodeling and equipping of this facility. However, as this project was being formulated, it occurred to me that this venture might not be within the

scope of physical therapy practice. Upon investigation, as this was to be a stand-alone facility without a veterinarian on the premises, the project would be in violation of the state codes. I reluctantly informed my friend that investing our time and money would be risky and the plans were abandoned.

Later, after investigating other practices at the time, I advised my friend that he could establish his facility for wellness or exercise purposes. I let him know that my PT license would just be a liability in offering treatment for animals. This notion did not sit well with him, as he wanted a real rehab facility with a PT director.

I did not let this disappointment deter me from pursuing my interest in animal PT. I continued to study the field by reading veterinary, physical therapy, and related textbook, journal, and magazine articles, and by continuing to practice on my own animals. When I received news of the formation of the SIG, I joined immediately. While attending the first "Equine 1" course offered by the Orthopaedic Section, APTA, Inc., I was struck by a comment made by the instructor, Amanda Sutton, MCSP, SRP, Grad. Dip Phys. She stated that as a 13-year-old all she could think of to be when she grew up was an Equine Physiotherapist. Since that day, I have always felt that a 13-year-old growing up in Maryland (or anywhere else) should have the opportunity to fulfill this dream.

Continuing my interest in PT for animals, I attended the Orthopaedic Section "Canine 1" course and took the home study "Basic Science" courses when they became available. Knowing full well that I would not receive reimbursement and that the Maryland State Board of Physical Therapy Examiners (MSBPTE) had stated they could not grant continuing education credits for animal related course work. (Later, they revised this by stating they must accept any course offered by the APTA). I discussed establishing a rehabilitation clinic in veterinary hospitals; however, was unable to come to terms in negotiations. Then in 1999 my world changed. Without getting into details here, career, family, and other issues prevented me from continuing formal education and establishing a practice in the field

In late 1999, I became the third Maryland State Liaison for the SIG when Micki Fox could no longer serve in this capacity. In response to continued interest from PTs and PTAs, the MSBPTE assembled the Maryland Animal Physical Therapy Task Force (TF) in August 2001. I was appointed chair of the TF due to the work Micki and I had done as SIG State Liaisons.

The TF adopted the APTSIG's original goals as follows: promote physical therapy for animals; share information; collaborate with other health professionals; develop educational programs; foster research; create guidelines for practice; encourage appropriate legislative changes; establish a nationwide/worldwide network, and; protect professional practice. Although overwhelmed at times by the enormity of this undertaking, I remain optimistic about the possibilities for constructive change acknowledging PTs and PTAs as providers of physical therapy for animals.

It would be misleading for SIG members to believe I am replacing David Levine as your VP. I do not have the background in education and authorship that Debbie Gross-Saunders, Cheryl Riegger-Krugh, and Dave have; the research experience and university faculty status of Cheryl and Dave; nor the verve, experience, and energy of Lin McGonagle. To my great relief and reassurance Lin, Cheryl, and Dave have all told me they will continue to contribute to the SIG in some capacity.

What I do have is an abiding dedication to the field and the commitment to serve you, the SIG members. So please contact me if you have any issues to address, comments, concerns, or questions to discuss that you think important to the SIG. During Combined Sections Meeting, developing a listserv for SIG members was discussed to facilitate communication. This is a great idea to be implemented. Another exciting development was the addition of 'Animal Assisted Therapy', a discipline that perhaps should have been included all along!

Clarification: It was reported in the previous newsletter that I had suggested a meta-analysis for animal physical therapy. Although this is a grand and ultimate goal, what I actually have in mind is a database of literature, similar to the APTA's "Hooked on Evidence" for the SIG. This idea grew out of the contention by the Florida Veterinary Association (reported in OPTP, 2001, Volume13, #2) that no body of knowledge exists for the practice of physical therapy with animals. This is simply not true. After having so many animal studies quoted by some of my PT school instructors I recall asking the question, "are you teaching us to treat rats or humans?" There is an abundance of species-specific studies in basic science and modalities related to physical therapy in many different journals, from both human and veterinary medicine.

Having just attended the APTA sponsored course "Evidence Based Practice in Your Clinic" by Robert Wainner, PT, PhD, ECS, OCS, FAAOMPT, I have a more thorough understanding of what an endeavor like this involves. Rob gave me some excellent information on how the SIG can perform literature reviews and compile a database. These techniques could be performed by anyone interested and articles added to the database. It would be relatively easy to compile individual research articles. However, systematic reviews or the ultimate meta-analyses probably do not currently exist for animal physical therapy. A much more daunting task would be to assemble a panel of content experts for such reviews. But it can be done!

Sincerely yours,
Steve Strunk, PT