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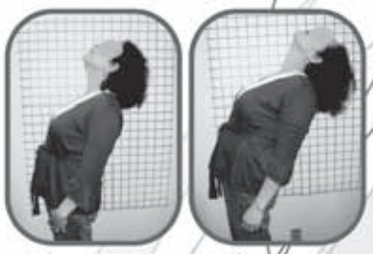

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1741_OP.indd 136 7/1/10 10:42 AM

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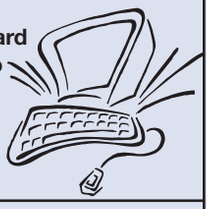

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Editor's Note

Too Little or Too Much… With No In-between!

Christopher Hughes, PT, PhD, OCS

As I write this editorial in June knowing it will not appear until August, I can't help but think about what the end of summer to fall transition means to most, including me. Summer vacations will soon have run their course, to do lists scheduled in the summer hopefully will have been completed, and we once again will wonder…where does the time go? Why does summer seem so long in anticipation but so quick to pass?

Summer to fall is also a very enjoyable time for kids. The summer brings a sense of freedom from full-time school activities and a time when kids can be kids and just play. With such a release of energy they then return to school in the fall with a sense of readiness and exciting anxiety of advancing to the next grade, reacquainting with former schoolmates, meeting new friends, and of course a new teacher.

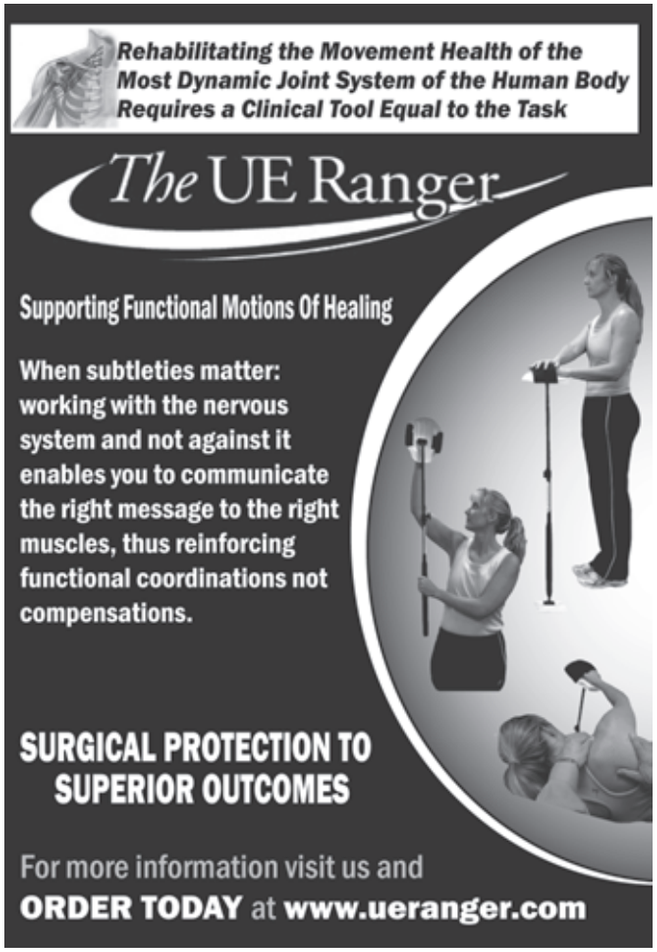
Well, at least that was the way it was when I was a kid. Today some of these experiences have remained but others have drastically changed. Can kids still be kids? Now more than ever we have a bit of dilemma on our hands. Kids seem to be either overcommitted in structured sporting activities and pushed hard to compete at an elite level risking injury while others have abandoned the spirit of physical play in lieu of the satisfying the "addiction" to the Nintendo and the Wii.

The first situation is familiar to physical therapists that treat these kids. I am sure as a clinician you have at least once run into the "golden" child who has been pushed into sports at all costs. The sometimes well intended parent but with an overzealous hard driving personality whose first statement to you following the child's evaluation is …."Well you know "We" have a championship tournament coming up and he/she needs to play." Pretty eye opening experience I must say! Ironically as you begin to spend time in rehabilitation with the child, they freely confess….I don't even like the sport but my parents seem happy that I play. A teachable moment indeed for all involved!

Sport specialization at a young age has become extreme. Coaches, parents, and even kids are under the perception that to excel they have to be committed full time almost on the scale of a professional athlete. The perceived benefits seem worthy to all involved. But the evidence is clear such practice is detrimental to the child and the odds of going pro from such an effort continue to be a long shot. Public outreach resources like those presented at www.stopinjuries.org initiated by the American Orthopaedic Society for Sports Medicine (AOSSM) focus on promoting sports safety especially as it relates to preventing overuse and trauma injuries. Two books I have read and recommend on this topic are *Game On* by Tom Farrey and *Until it Hurts* by Mark Hyman. Both books document how far the extreme can go. As I read each book I found myself shaking my head in disbelief but also reading on in an attempt to gain insight into how to combat the trend. Ironically, both authors talk about research that cites the number one reason boys and girls willingly participate in school and nonschool sports programs is because it is FUN! The examples provided by each author speak to the contrary. The reality is that the experience has become less about child development and more about adult entertainment and social status. Despite documenting the horrors of childhood sports, both books offer guidelines and recommendations to parents and coaches on how to put the play back into sports

As a father of a 6-year-old girl and a 9-year-old boy, I feel the process of lines already being drawn in the sand and that the "thinning of the herd" has already begun. Soccer has been fun for them but how much longer can it be just for fun? Travel squads, multiplicity of sport and speed camps, and rivaling sports organizations all compete for the relatively small pool of early maturing kids and their proud parents who are willing to shell out big bucks and travel across state lines to make sure they don't cheat their child of the opportunity to compete at the highest level. Such is the nature of organized sports. I am not opposed to competition, but the business has filtered down to the 6-year-old level. Like most parents I just want my kids to appreciate exercise and experience the joy of hard work, team building, and self improvement that comes with sports involvement and a

(continued on page 140)



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no quit attitude. But after getting a firsthand look at some practices and parental aggressions, it has become clear that I may be unrealistic in thinking that sports are about these ideals anymore.

As if this situation isn't a big enough challenge there is the other side of the coin, those who do not get enough exercise and run the risk of childhood obesity. I am sure you are familiar with the health complications derived from a lack of exercise, everything from increased cardiovascular, psychosocial, orthopedic problems, and even a higher incidence of asthma and sleep apnea.

Admittedly a multifactorial problem I believe the two (youth sports pressure and childhood obesity) are related. Too much activity for the young gifted athlete and too little for the average kid to experience and take part in. The weeding out from the privileged structured sports pyramid at a young age, and even effects from the continued de-emphasis on PE in schools will make sure that there will be limited opportunities to experience the positive long term effects of physical exercise and sport participation. Promotional campaigns like the NFL's play sixty campaign and the First Lady's Let's Move! initiative to end childhood obesity offer awareness; but as clinicians, we must play a vital role in spreading the word to our patients and also getting involved in a variety of community activities that support child fitness and play.

As health care providers we have a responsibility to intervene at both ends of this quandary. Whether it be through volunteer efforts, or counseling activities, or just getting out being good role models by being engaged in healthy activities and physical exercise we owe it to the kids and the community. The more positive experiences we can tie to exercise the better the future for our kids to grow up healthy. With the continued impending changes in health care, we will be doing our kids and society a big favor as it will always be cheaper to stay healthy than to treat sickness especially those tied to hypokinetic diseases.

I hope you get a chance to check out some of the readily accessible online resources I have listed below. In the meantime PLAY ON!

REFERENCES AND SUGGESTED READINGS

Protecting Youth in Sport

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Fighting Childhood Obesity

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- http://www.cdc.gov/obesity/childhood/index.html
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1741_OP.indd 140 7/1/10 10:42 AM

Clinical Applications of Functional Foot Orthoses

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ABSTRACT

This paper addresses common clinical uses of functional foot orthoses for foot and ankle ailments, and explores their application to favorably alter tibiofemoral kinematics. Three general categories of functional orthotics can be described as medial, lateral, and posterior supportive modifications. Evidence suggests that orthotics with medial support can improve kinematics in the lower extremity by reducing valgus moments in the rearfoot and knee as well as reduce medial tibial rotation. Therefore orthotics with medial support may be an appropriate intervention for conditions associated with excessive pronation. Orthotics with lateral support have been found to promote valgus moments at the subtalar joint and knee and therefore may be an appropriate intervention for individuals with lateral ankle instability and medial compartment knee arthritis. Studies have found posterior (heel) lifts can reduce gastrocnemius muscle activity, increase ankle dorsiflexion excursion, and increase knee flexion angles during weight bearing. Therefore a heel lift maybe an appropriate intervention for individuals with pathology of the Gastrocnemius/Achilles tendon region, conditions associated with decreased ankle dorsiflexion range of motion, and/or conditions in which controlling knee flexion angles and total knee excursion are desired. In general, research is available to show that an orthotic has the potential to change multiplanar moments in the foot and knee. However, more research is needed to fully understand their potential influence on clinical outcomes.

Key Words: kinematic, lift, lower extremity

INTRODUCTION

Foot orthoses are generally classified as accommodative or functional.[1] Accommodative orthoses are intended to redistribute forces away from painful areas of the foot and typically are prescribed for patients who have foot ailments associated with systemic disease (ie, diabetes).[1-5] Functional foot orthoses are designed to decrease pain by altering lower extremity kinematics and kinetics.[1,2,6,7] Functional foot orthoses are most commonly prescribed for patients who have complaints of pain associated with biomechanical abnormalities of the foot and ankle.[8-10] This paper addresses common clinical uses of functional foot orthoses for foot and ankle ailments, and explores their application to favorably alter tibiofemoral kinematics.

Functional foot orthoses can be constructed in a variety of ways depending on the condition it is being used to treat. Three general categories of support can be delineated based on their position of support: medial, lateral, and posterior. Medial and lateral support modifications incorporate posting or wedging to the forefoot and/or rearfoot. A posterior support modification is accomplished by the use of a heel lift. Each type of support generates different structural and functional changes throughout the lower extremity kinetic chain.

MEDIAL POSTING/SUPPORT

Foot orthoses that incorporate a medial post or wedge are widely used as an intervention for many foot and ankle ailments. Most commonly, this type of orthosis is prescribed as a means to treat overuse injuries[7,11,12] including plantar fasciitis and posterior tibialis tendonitis or structural deformities classified as pes planus.[9] The cause of the pain and inflammation associated with these diagnoses is thought to result from excessive foot pronation caused by excessive forefoot varus, rearfoot varus, and/or genu valgus deformities.[9,10,13] When loads are transmitted through the foot during weight bearing activities, these foot postures potentially cause increased stress on the soft tissue support structures.[14-17]

The goal of orthotic intervention is to support the skeletal framework of the foot and therefore, minimize the strain on the injured or irritated structures.[18-20] Research has demonstrated that this form of conservative treatment can be successful in reducing pain and improving the overall function of individuals suffering from plantar fasciitis.[21] Studies have shown orthotics to be 70% to 80% effective in reducing the symptoms and recurrence of overuse injuries in runners.[22,23] Cadaveric studies have also confirmed that a medial arch modification that supports the foot in subtalar neutral significantly reduces the percentage of strain and the rate of loading experienced by soft tissue structures, namely the plantar fascia, compared to barefoot and shoe alone conditions.[15]

The exact mechanism through which medial support orthoses alter the foot and reduce strain has been widely investigated. MacLean et al[9] recruited 15 healthy female runners to perform running tasks custom-made foot orthoses. These orthoses were cast corrected to calcaneal vertical and had 5° of medial posting added. The results demonstrated differences in foot kinematics between orthotic conditions. Subjects exhibited decreases in maximum rearfoot eversion angle, calcaneal eversion angle, rearfoot eversion velocity, and in the maximum internal ankle inversion moment. Similar results were presented in a separate study that investigated medial posted and medial custom-molded foot orthoses.[7] The custom-molded orthotics were created from a positive molding of the individual subject's foot creating a shell that conforms to the plantar surface of the foot. Nonmolded orthotics consisted of a flat padding that was not shaped to the features of the individual's foot. Posting of the orthotics occurred by adding material to the medial aspect of the orthosis to increase the width to 6mm.[7] It was found that a 6mm medial posting on a nonmolded orthosis reduced maximum foot eversion and ankle inversion moments, and increased maximum knee external rotation moments. Custom-molding to subtalar neutral, with and without posting, reduced vertical loading rate and ankle inversion moment, and increased maximum foot inversion and maximum knee external rota-

1741_OP.indd 141 7/1/10 10:42 AM

Table. Summary of Changes in the Foot, Ankle, and Knee Related to Foot Orthoses

Type of support	Effect on foot	Effect on ankle	Effect on knee
Medial	↓ rearfoot eversion ↓ calcaneal eversion angle ↓ rearfoot eversion velocity ↓ maximum foot eversion moment ↑ maximum foot inversion moment	↓ ankle eversion ↓ maximum internal ankle inversion moment	↑ maximum tibial lateral rotation moment ↓ tibial medial rotation moment ↓ valgus angle
Lateral	↓ strain in plantar aponeurosis ↓ time of load acceptance in plantar aponeurosis ↑ subtalar joint valgus ↑ subtalar joint valgus moment ↓ supination	↓ lateral instability	↓ varus moment
Posterior	↓ soft tissue strain	↑ dorsiflexion excursion	↑ knee flexion angle? ↑ knee flexion excursion?

tion moment.[7]

It appears that medial support to the foot successfully reduces the excessive pronation associated with painful syndromes such as plantar fasciitis, posterior tibialis tendonitis, and pes planus. In doing so, there is an overall decreased strain and prolonged rate of load application to the soft tissue support structures of the foot. However, the kinematic changes that occur with medial support orthotic interventions are not limited to the applications at the foot. More recent research has focused on the effect of foot orthoses on the tibia, and thus the potential to also influence the knee.

ROLE AT THE KNEE

Due to the bony approximation of the talus and the tibia at the talocrural joint, a mechanical coupling occurs between movement patterns in the subtalar joint and the tibia. Research has demonstrated that subtalar pronation is associated with medial tibial rotation.[7,24,25] Patellofemoral Pain Syndrome (PFPS) is often associated with excessive subtalar joint pronation.[23,26,27] It has been suggested that increased foot pronation elicits medial tibial rotation, which promotes a relative lateral gliding of the patella on the femur.[28,29] The result is an abnormal shearing occurring between the patella and the femur causing pain and inflammation.[23,29] In addition to increased medial tibial rotation, excessive foot pronation has also been linked to increased valgus positioning at the knee.[30,31] The component motions of knee valgus are often described as medial femoral rotation and adduction, tibial abduction, and ankle eversion.[30,31] Excessive knee valgus has been linked to a number of diagnoses, including overuse injuries in runners[27,32] and anterior cruciate ligament (ACL) injuries.[30,33]

Medial support foot orthoses have been implemented as a conservative intervention for conditions affecting the knee. The use of custom-made medial rearfoot and forefoot posted foot orthotics designed to promote a subtalar neutral position was found to significantly reduce the pain ratings described by adolescent females diagnosed with PFPS and classified as having excessive foot pronation.[34] Additionally, research has demonstrated that similar orthotics can positively influence frontal plane and transverse plane kinematics at the tibiofemoral joint.[7,35-39] Medial posted orthotics have been shown to decrease medial tibial rotation and/or increase lateral tibial rotation moments.[7,35-37] Radiographic evaluation has found that patellar alignment is corrected in individuals with excessive rearfoot valgus when medial rearfoot posted foot orthoses are donned.[38] Knee valgus angles have also been demonstrated to decrease with the use of medial support foot orthotics. Joseph et al[39] asked 10 National Collegiate Athletic Association (NCAA) female athletes to perform a drop-jump task with and without an orthotic with a 5º medial post. They found a reduction in knee valgus angles at initial contact and in the peak valgus angle when the orthotics were in place. Additionally, they noted less overall ankle eversion throughout the maneuver when the subject wore the orthotics.

Although it is not common practice, evidence does exist that medial support foot orthoses are effective in promoting proper joint alignment and improving kinematics at the knee. More specifically, these type of orthoses have the potential to control conditions resulting from excessive medial tibial rotation and/or valgus at the knee. The success of using medial support to address overuse injuries and structural deformities in the foot is documented. Due to the close relationship between subtalar and tibial motions and the link of the tibia to the knee, it seems reasonable to suggest that similar success would be found in influencing these issues at the tibiofemoral joint as well. More research is needed to understand the full potential of this form of intervention at the knee.

LATERAL POSTING/SUPPORT

Orthoses that use a lateral posting or support wedge are used much less frequently as a clinical intervention for foot and ankle ailments. This type of orthotic has been suggested for treatment with diagnoses including plantar fasciitis,[40] pes cavus, peroneal tendonitis,[41] and any lateral instability related to a history of ankle sprains.[42] Research is limited on the overall influence of lateral support orthoses. Kogler et al[40] found that a 6º lateral forefoot wedge reduced strain and time of load acceptance in the plantar aponeurosis of cadaveric specimens. Most often a lateral support (posting or wedging) is administered in order to prevent subtalar joint supination.[41,42] Research has demonstrated that a 5º lateral wedge can successfully limit excessive motion at the subtalar joint in individuals with an unstable lateral ankle.[43] This is especially relevant as one study identified an 80% recurrence rate associated with athletes who have sustained lateral ankle sprains.[44]

1741_OP.indd 142 7/1/10 10:42 AM

Studies that document the kinematic alterations generated by lateral support orthotics are also sparse. Kakihana and colleagues[42] divided 50 male collegiate athletes into 2 groups: a healthy control group and a group with a history of chronic lateral ankle instability to assess the influence of a 6º full length lateral wedge insole during gait. The investigators found that the subtalar joint valgus moment was greater for the lateral wedge compared to shod conditions. This valgus moment at the subtalar joint would oppose the tendency for subtalar supination seen in individuals with lateral ankle instability.

Despite limited evidence, the use of lateral support orthoses has been shown to alter faulty kinematics in the foot that can lead to both acute injuries and chronic pain syndromes.[40-43] However, as noted with the medial support orthoses, the close relationship between the subtalar joint and the tibia can result in additional changes at the knee. The study by Kakihana et al[42] also found that varus moments at the knee were reduced in gait cycles where a 6º lateral wedge insole was involved. This finding suggests that lateral support orthoses have the potential to change kinematics at both the foot/ankle complex as well as the knee.

ROLE AT THE KNEE

A large body of research has focused on the use of lateral foot supports related to one specific tibiofemoral diagnosis: osteoarthritis (OA). Sasaki[45] and Yasuda[46] originally suggested the use of laterally wedged insoles for medial compartment knee OA. Their research demonstrated that a lateral insole generated subtalar valgus and a more vertically aligned tibia. They concluded that this alignment could control excessive loading of the medial knee and cause a reduction of knee pain. Further research has demonstrated that lateral support orthoses are successful in decreasing pain[46-49] and reducing the amount of pain medication taken by subjects.[50,51]

The indirect relationship between subtalar supination and knee varus has also been confirmed by the studies investigating lateral support orthoses.[52,53] Lateral insoles have been shown to increase subtalar joint valgus moments while at the same time reduce varus moments at the knee. This reduction in varus stresses at the knee can often be the intended goal of the orthotic intervention. Reducing the initial peak knee varus moment during gait is believed to decrease knee contact forces and to reduce joint degeneration.[54] Research involving subjects with medial compartment knee OA have found a reduction in this early knee varus moment when lateral posted or molded orthoses are used.[52,54,55]

Recent evidence exists to support the use of lateral support orthoses as a means to reduce the pain associated with medial compartment OA.[46-49] Additionally, the kinematic alterations are favorable in terms of reducing the varus stress associated with joint degeneration in individuals with OA. Research has also demonstrated that varus stress is controlled in individuals with healthy knees,[53] perhaps suggesting the potential role of lateral foot supports as a preventative measure. The full extent of the positive and negative ramifications of lateral foot orthoses at both the foot and the knee require much more investigation.

POSTERIOR SUPPORT/LIFT

Posterior (heel) lifts are a third type of foot orthotic used as a conservative intervention for overuse injuries of the foot. They are most commonly prescribed as a treatment for Achilles tendonitis or bursitis. A goal in managing Achilles tendonitis is to reduce tension on the tendon itself. A firm heel cushion or lift can be placed in the individual's shoe to elevate the rearfoot and minimize the strain on the Achilles tendon.[41] Research has also demonstrated that gastrocnemius muscle EMG activity decreases during weight bearing activities when a heel lift of 1.9 to 5.7cm in height is in place, which also lessens the load in the tendon.[56]

It has been theorized that limited ankle joint dorsiflexion range of motion may predispose individuals to overuse injuries, including Achilles tendonitis.[13,57,58] Limitations in available ankle dorsiflexion may decrease ankle dorsiflexion excursion and decrease time to heel off in the gait cycle. These kinematic changes cause unusual wear and tear on the soft tissue structures of the foot and ankle.[59,60] The implementation of a heel lift has been shown to favorably address these issues. Johanson and associates[61] recruited 26 volunteers with less than 5º total ankle dorsiflexion range of motion. Kinematic data was collected while the subjects ambulated with 3 different heel lift conditions: 0, 6mm, and 9mm. The results demonstrated an increase in ankle dorsiflexion excursion and an increase in time to heel off during gait.

As noted with the other forms of foot orthoses, posterior supports have been shown to have desirable influence on kinematic deviations of the foot and ankle that often lead to painful conditions and injuries. Heel lifts have been shown to improve available ankle dorsiflexion excursion and assist in diminishing the strain in the soft tissue structures of the foot, including the Achilles tendon. However, it is also important to explore the relationship between sagittal plane ankle and knee mechanics. For example, in order to perform ankle dorsiflexion in weight bearing the tibia has to progress anteriorly over the talus and an associated flexion at the knee must occur.[62] Also consider that individuals with restricted gastrocnemius muscle flexibility often compensate by ambulating with a more flexed knee to allow for greater available dorsiflexion.[57] This close relationship suggests that heel lifts have the potential to influence the knee in similar manners to which they alter foot and ankle kinematics.

ROLE AT THE KNEE

Research investigating the effect that heel height has on the knee has mainly focused on high-heeled shoes. Static postural analyses have shown that increasing heel height is associated with increasing knee flexion angles.[63] Studies looking at gait patterns with high-heeled shoes have demonstrated similar increases in knee flexion angles.[64-66] Opila-Correia[66] investigated the 3-dimensional changes in lower extremity kinematics during gait in low heeled (1.6 cm) and high-heeled (6.1 cm) shoes. The results demonstrated an increase in knee flexion angles at heel strike and midstance phase of the gait pattern with increased heel height.

The clinical importance of controlling knee flexion angles and total knee excursion is related to the number of injuries that are associated with sagittal plane knee kinematics. One primary example is ACL injuries. Videotape analysis of ACL injuries in both men and women has demonstrated that a common characteristic in these injuries is landing from a jump with a more extended knee posture.[33,67,68] The ramifications of more extended knee postures include decreased hamstring activity[69-71] resulting in excessive quadriceps femoris muscle group loading,[69] increased tibial anterior translation,[70,71] and increased ground reaction forces (ie, landing forces).[72,73] Furthermore, less total knee joint excursion occurs

1741_OP.indd 143 7/1/10 10:42 AM

throughout the maneuver resulting in a shorter time period for the application of the loads at the joint.[74] Each of these imbalances has been shown in current research to be associated with risk factors for ACL strains or tears.[30,75-77]

No research was identified that explored the effects of a posterior support or heel lift on the risk factors for knee injuries. However, it is known that increased heel inclination produces increased knee flexion angles during static and dynamic weight bearing activities.[63-66] It seems plausible that the addition of a heel lift could alter knee kinematics and diminish the negative results associated with performing activities with a knee close to extension. This concept warrants more investigation and is currently being examined in our laboratory.

CONCLUSION

Foot orthoses are readily used to successfully treat painful conditions in the foot and ankle. Depending of the specific construction, an insert has potential to increase or decrease multiplanar moments throughout the foot. During closed-chain activities, any changes that occur in the kinematics of the foot also have the potential to impart biomechanical changes at the knee. As noted, lateral posted foot inserts have been used clinically in patients with OA to diminish compression forces at the medial tibiofemoral joint by diminishing varus stresses at the knee. Research has demonstrated that foot orthoses can also address excessive knee valgus postures, improper patellar tracking, and lack of knee flexion. This type of conservative intervention could be used clinically as a prevention or treatment method for painful knee conditions including, but not limited to, osteoarthritis, Patellofemoral Pain Syndrome, anterior cruciate ligament strain/tear, and other overuse injuries. More research is needed to fully understand the potential influence foot orthotics can have at the knee and the appropriate clinical outcomes that can be expected.

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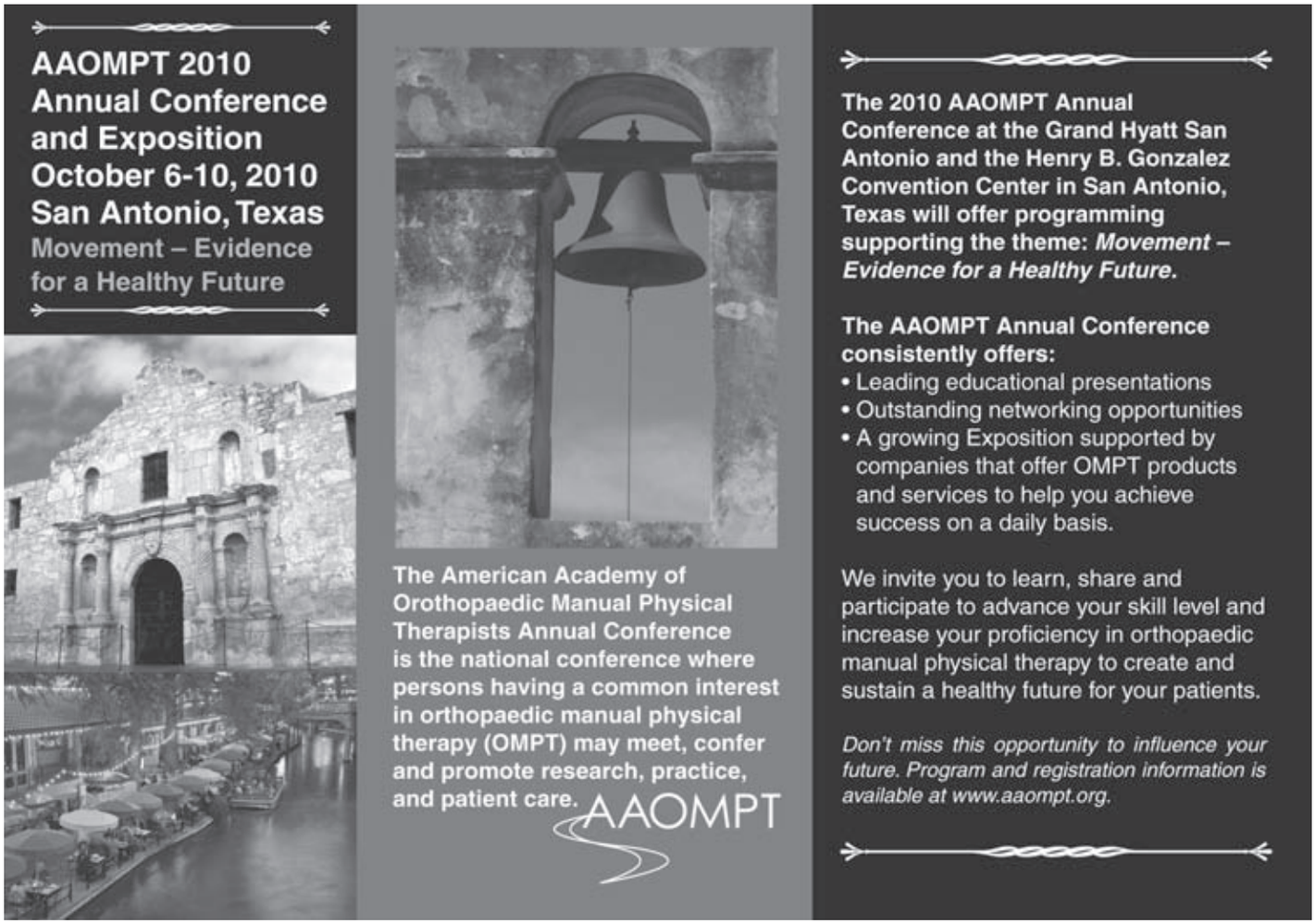

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1741_OP.indd 146 7/1/10 10:42 AM

A Retrospective Study to Determine the Effectiveness of Nonoperative Treatment of Hip Labral Tears

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ABSTRACT

Purpose: To determine the effectiveness of nonoperative treatment of hip labral tears. **Background:** There is evidence that hip muscle imbalance may lead to abnormal movement patterns that may contribute to acetabular labral pathology. Exercises to correct these movement patterns may improve patients' functional mobility and avoid hip arthroscopy, which is currently the treatment of choice. Methods: Medical records of patients diagnosed by a single orthopaedic surgeon with hip labral tears were reviewed. Hip strength and a self-reported Hip Outcome Score were assessed pre- and post intervention. Paired t-test with a Bonferroni adjustment was used for analysis. **Findings:** Hip strength of the involved and uninvolved leg was statistically different at initial evaluation and became similar at discharge, except for hip abduction/external rotation strength. Subjects had an average improvement of 19.1% and 18.6% for the ADL and sports subscales. **Clinical Relevance:** Nonoperative treatment showed a pattern of success but a larger prospective study is necessary to draw definitive conclusions.

Key Words: hip injury, physical therapy, rehabilitation

INTRODUCTION

Hip arthroscopy has become an increasingly popular technique for the repair of soft tissue hip injuries over the past few years. It is being used more frequently and the indications for treatment continue to expand. Recently, there has been increased interest in acetabular labral tears as a source of symptoms and functional limitation in the hip region. The labrum of the hip functions to enhance joint stability, decreases contact stresses between the acetabular and femoral cartilage, and provides proprioceptive feedback.[1] Labral tears can be due to trauma, femoral acetabular impingement (FAI), capsular laxity, or hip dysplasia. Symptoms associated with labral tears can include anterior groin pain, clicking, locking, instability, catching, giving way, and stiffness.[2] Gadolinium enhanced magnetic resonance arthrogram (MRA) is the diagnostic imaging tool of choice when evaluating for hip labral tears.[3] In a study by Narvani et al, clicking had 100% sensitivity and 85% specificity for a labral tear as identified by MRA.[4] Labral tears were identified arthoscopically in studies by Fitzgerald et al and McCarthy et al. These researchers reported that 90% of individuals with mechanical hip symptoms were confirmed to have hip labral tears when evaluated arthroscopically.[5,6]

Femoral acetabular impingement occurs when there is decreased joint clearance between the femoral head-neck junction and the acetabular rim. Lavigne et al described two types of FAI—Cam and Pincer;[7] in both types of FAI, bony abutment occurs with the combined movement of hip flexion, adduction, and internal rotation.[8] Numerous studies have reported a high incidence of bony morphological abnormalities in individuals with known acetabular labral pathology. However, less is known about the movement patterns underlying these injuries.[9] A case study by Austin et al showed excessive hip adduction and internal rotation during a single leg step down task. The same movement pattern has been identified in patients with patellofemoral pain syndrome (PFPS).[9] Mascal et al correlated these movement patterns with weakness of the hip abductors, extensors, and external rotators as demonstrated by hand-held dynamometry testing.[10] A study by Dierks et al focused on runners with patellofemoral pain and compared them with controls that experienced no pain. Hip muscle strength testing in this study showed that symptomatic patients had weak hip abductor musculature that was associated with an increase in hip adduction angles during running.[11] This study highlighted the need to address proximal factors in runners with PFPS.[11]

Arthroscopic debridement of the labrum is a common procedure to treat acetabular labral lesions. However, some studies suggest that hip debridement for labral tears may have a detrimental effect on the biomechanics of the hip since it compromises the sealing function of the labrum.[1,12] A compromised sealing of the labrum will result in increased friction and loading of the articular cartilage that may lead to degenerative changes associated with osteoarthritis.[10] These results suggest that practitioners should consider the repair of the labrum rather than just simple debridement.[10] To our knowledge, there are no studies that have looked at identifying the underlying cause of these complicated biomechanical problems but instead are focusing on the surgical treatments. With no knowledge of the long term outcomes following labral surgery, hip problems may continue to occur and surgical interventions may continue to be necessary. Additionally two studies found a large number of hip labral tears identified in cadaveric subjects leading the researchers to believe that labral tears may just be a natural part of the aging process.[2,13] Finally, with surgical intervention come the traditional risks of surgery including potential for bleeding, infection, wound healing problems, and risks from anesthesia and medications following surgery.

We hypothesize that we can manage labral pathologies at the hip with conservative nonoperative treatment. By performing a comprehensive evaluation including gait analysis, hip muscle strength tests, MRA, and intra-articular injections and developing a closely monitored physical therapy treatment program, we believe patients can

1741_OP.indd 147 7/1/10 10:42 AM

return to normal levels of activity without surgical intervention. Lastly, if the pain reoccurs after conservative treatment, then ultimately arthroscopy may be considered as a subsequent treatment.

The purpose of this research was to conduct a small pilot study by retrospectively reviewing the outcomes of a series of patients treated for hip labral tears. Our specific hypotheses were: (1) All patients affected leg hip muscle strength significantly improved from the initial evaluation to discharge. (2) Hip muscle strengths which differed significantly between the injured and uninjured legs at the initial evaluation will no longer be significantly different at discharge. (3) Patients will show significant improvement in self-reported scores for activities of daily living and sports related activities subscales between the initial evaluation and discharge.

The results will determine the feasibility of doing a larger prospective study to examine the effectiveness of nonoperative treatment of hip labral tears.

METHODS

This research was performed in an effort to review the outcomes of patients being treated for hip labral tears. Nine patients were included this study--5 females and 4 males with an average age of 41 (range 18-65). The patients were seen at the Memorial Hermann Sports Medicine Institute in Houston, TX. The patients were diagnosed by a single orthopaedic surgeon. All patients had MRA and intra-articular injections to identify hip labral tears and the location of the source of pain. Once diagnosed they were then referred to the same physical therapist for evaluation and treatment with a focus on identifying and correcting impairments that may lead to abnormal movement patterns.

The Hip Outcome Score (HOS) was used to assess the outcome of the treatment intervention. The scale is shown in Appendix A. This instrument is a self-report questionnaire with two subscales, ADL and sports, and has been shown to be a valid tool for individuals with labral tears.[14] Patients were asked to rate their current level of function for usual daily activities and sports related activities from 0 to 100 with 0 being an inability to perform any activities and 100 fully functional. In addition, to the self-reported score, the treating therapist measured hip strength using a handheld dynamometer. Lastly, 7 of the 9 subjects were qualitatively evaluated using two-dimensional, video-based gait analysis at the request of the treating therapist and orthopaedic surgeon to definitively identify any biomechanical abnormalities or weaknesses present during movement. Patients were referred for video gait analysis if they were symptomatic with walking and/or running.

GAIT AND MOVEMENT ANALYSIS PROTOCOL

At the initial physical therapy evaluation video is collected of the patient walking or running on a treadmill at a self-selected speed using Dartfish 4.5.2.0 (Dartfish, Alpharetta, GA). This program allows for frame by frame playback of the video and the collection of isolated images at any point during the gait pattern. A diagnostic report is then generated by the sport biomechanist and given to the therapist. This report includes recommendations based on biomechanical abnormalities found in the videos. Table 1 describes the possible biomechanical abnormalities and the recommendation for treatment of each abnormality.

STRENGTH TESTING PROTOCOL

Isometric muscle testing for hip abduction, abduction with external rotation, and extension was performed during the initial visit and on the day of discharge. Strength testing was performed using procedures described by Ireland et al.[15] Hip strength was assessed using a Microfet 2 handheld dynamometer (Hoggan Health Industries, West Jordan, UT) and was performed by the same physical therapist for all subjects.

Hip abduction isometric testing was performed in a sidelying position. A pillow was placed between the subject's lower extremities to position the hip of the tested limb in a slightly abducted position. The center of the force pad of the dynamometer was placed approximately 5 cm proximal to the lateral knee joint line. The dynamometer was held by the physical therapist. Once the subject was positioned, they were instructed to lift the limb upwards with maximal effort for approximately 5 seconds. The patient was instructed to keep head and body in sidelying and was carefully monitored to keep tested hip in neutral and avoid trunk rotation. The force value displayed on the dynamometer was recorded and the device was zeroed prior to the next measurement. Three trials were performed with 15 seconds rest between trials. The peak value from the 3 trials was recorded.

Hip abduction and external rotation strength isometric testing was performed with subjects in a sidelying position. The hip and knee of both lower extremities were flexed to at least 45° with the tested limb on top. The dynamometer was placed approximately 5 cm proximal to the lateral knee joint line and was held in place by the physical therapist. The patient was instructed to lift the tested knee by rotating limb out while maintaining contact on both feet. The patient's pelvis was stabilized posteriorly by the therapist to avoid lower trunk rotation during testing.

Hip extension was performed with subjects lying prone with the knee flexed to 90º on the tested limb. The dynamometer was placed approximately 10 cm proximal from the center of the popliteal fossa. The dynamometer was held by the physical therapist. To stabilize the trunk, the patient was instructed to extend hip while keeping the front of the hips on the table.

STATISTICS

All data was analyzed using SPSS to test for significance using paired t-tests. Muscle strength measurements that compared injured and uninjured legs at the initial evaluation and again at discharge were tested for significance using a paired t-test with a Bonferroni adjustment (alpha = 0.017 after adjustment). Self-reported measures of im-

Table 1. Biomechanical Abnormality and Treatment Recommendation for Each

Biomechanical Abnormality	Treatment Recommendation
Medial Collapse (ankles rolling inward)	Stability shoe or Orthotics
Hip, Knee, or Ankle Internal/External Rotation	Hip Strength & Flexibility Regimen
Hip Abduction/Adduction	Hip Strength & Flexibility Regimen
Hip Drop	Hip Strength & Flexibility Regimen
Crossing over the Midline of the Body	Hip Strength & Flexibility Regimen
Upper Body Collapse	Core Strengthening

1741_OP.indd 148 7/1/10 10:42 AM

Table 2. Statistical Analysis of Muscle Strength Testing

				Paired T-test alpha values (Bonferroni adjustment)		
	Injured Initial n=9	Uninjured Initial n=9	Injured Discharge n=9	Injured Initial Uninjured Initial	Injured Initial Injured Discharge	Injured Discharge Uninjured Initial
Abduction / External Rotation	34.9±16.3	46.4±16.5	53.1±17.5	0.0001*	0.0001*	0.009*
Abduction	33.3±18.6	41.4±17.6	44.4±14.6	0.002*	0.006*	0.217
Extension	32.2±15.9	46.1±18.7	38.4±15.3	0.004*	0.006*	0.045

* Alpha Values < 0.017 are significant

provement were tested using a paired t-test (p value < 0.05).

RESULTS

The data for the 9 subjects was analyzed to determine any trends towards changes in self-reported outcome scores and hip musculature strength. In Table 2 an alpha value less than 0.017 indicated a significant change, and in Table 3 a p-value less than 0.05 indicated significance. Starred items indicate results were found to be statistically different. Paired difference means and standard deviations were included in Table 2 for analysis of minimally clinically significant differences. One patient failed to report their self-rating; therefore, they were excluded from the self-reported statistical analysis.

The strength measurements of abduction, extension, and abduction with external rotation were all found to be significantly different between the injured and uninjured legs at initial evaluation. The same measurements showed significant improvement from initial evaluation to discharge on the injured leg. At the time of discharge, the strength measurements for the injured leg compared to the initial evaluation measurements for the uninjured leg were not statistically different for abduction and extension. There was not a statistically significant change in self-reported outcome scores between initial evaluation and discharge; however, they did meet the criteria for minimally clinically significant differences.

DISCUSSION

Hip labral tears have now become another common source of pain. While there is much discussion among surgeons about what is the best surgical treatment for a patient with a labral tear, there has been little discussion in the literature how to address treatment without surgery. Hip labral tears can occur either by an isolated traumatic event or in many cases it happens gradually due to a repetitive micro trauma to the labrum from the femoral head and acetabulum.[2,9] In some cases this may be due to tightness in the surrounding muscles that results in pinching between the femoral head and acetabulum in specific anatomical positions or due to bony abnormalities that cause additional contact between the femoral head and acetabulum.

Patients experiencing hip pain are usually very active based on the mechanism of injury. Surgical intervention means a recovery of 4 to 6 months before returning to normal levels of activity. This amount of time may be unrealistic for those who are used to being so active. Physical therapy prior to surgical intervention may help identify the impairments that lead to muscle imbalances of the lower quarter resulting in abnormal movement patterns that may promote anterior hip impingement. In this study, we used 2D video analysis of their gait and identified hip drop and excessive hip adduction angles during the stance phase of the involved leg in all of our patients who underwent the gait. Previous studies have used the step down task and the drop-jump landing task to evaluate this abnormal movement pattern.[9,12] Unfortunately we did not use these diagnostic tests, but we plan to include these tasks as part of the physical therapy evaluation for future patients. Once these impairments (strength, flexibility) were identified, patients were given a therapeutic exercise program to correct these impairments and improve muscle performance. The length of treatment varied depending on how involved the patient was in terms of pain as well as how they responded to the exercise progression. A criterion for advancement was noted as the ability of the patient to perform a specific exercise with proper form and without producing joint symptoms; they could advance. In this study, patients were seen twice a week for an average of 5 weeks (range 3 to 9 weeks). Criteria for discharge were as follows: (1) if they are able to perform exercises in functional positions independently with proper form and without producing symptoms, (2) able to perform single leg squat with good pelvic and hip control and without

Table 3. Statistical Analysis of Self-reported Outcome Scores

			Paired T-test Results		
	Injured Initial n=8	Injured Discharge n=8	Paired Difference Mean	Paired Difference Standard Deviation	p value
Activities of Daily Living Subscale Self Rating %	70.0±28.4	89.1±9.5	19.125	24.97	0.067
Sports Subscale Self Rating %	56.9±31.2	75.5±31.3	18.625	23.47	0.060

* Statistically significant finding p < 0.05

1741_OP.indd 149 7/1/10 10:42 AM

producing symptoms, (3) able to self-manage recurrence of symptoms, (4) return to desired level of activity. One (patient # 2) out of 9 patients was not able to progress to exercises in functional positions since he opted to see an orthopaedic surgeon due to persistent groin pain while sitting.

To our knowledge the only published report we were able to find addressing hip labral injuries and treatment in relation to nonsurgical intervention was a case study by Austin et al.[9] In this study the patient underwent MRA, evaluation of lower extremity kinematics during running, a single-leg step down test, and a drop jump maneuver. All tests indicated excessive hip adduction and internal rotation movements reproduced her pain. In this particular study they used a S.E.R.F. (hip and knee brace) to control her motion and limit the adduction and internal rotation. However the authors do suggest the need for physical therapy to address the weaknesses and allow patients to return to normal activity.[9]

For this study we used the principles and results of previous research on patients with patellofemoral pain and applied these principles to patients with labral tears. We measured hip abductor, external rotation, and extension muscle strength prior to treatment on the injured leg and uninjured leg and then measured the improvement on the injured leg again at discharge. We hypothesized that at the initial evaluation muscle strengths of the injured and uninjured legs would be significantly different while at discharge they would no longer be significantly different. Review of the results in Table 2, support our hypotheses for hip extension strength and abductor strength; however, the hip abductor/external rotation strength variable still showed a significant difference between the injured and uninjured legs at discharge. Because we did not re-measure the uninjured leg strengths at discharge we cannot definitively determine whether or not the muscle strength imbalance was eliminated. The goal of the therapy is to correct muscle strength imbalances and ensure that the patient has equal muscle strengths on both the injured and uninjured leg at discharge; therefore, in most cases the therapist will work with the patient to strengthen both legs throughout their treatment. Future studies should test both legs at discharge to give us a definitive answer to our hypothesis and ensure that we are returning patients to their normal levels of activity with symmetrical hip muscle strength. The current study also evaluated patient improvement based on self-reported scores relating to activities of daily living and sports related activities. These scores were reported in percentages with 0 being an inability to perform any activities and 100 being fully functional. Past studies have reported that clinical measures indicating patient improvement do not correlate with patient self-assessments of improvement; however, the current study indicates that improvement in strength measurements do correlate with patient self-reported improvements. While the self-reported percentages were not statistically different from initial evaluation to discharge, they were considered to be clinically significantly according to the measure, minimally clinically important changes (MCID) that is defined in the literature as a 15% change.[16] In the current study the Activities of Daily Living Self Rating had a percentage change of 19.1% and the Sports Subscale Self Rating had a percentage change of 18.6%. These results show that there is a trend towards clinical improvement correlating with patient interpretations of self-improvement. Further prospective studies will be necessary to verify this conclusion. Table 4 shows the raw scores using the HOS. A study on the reliability and responsiveness of the HOS showed that an increase in the score of above 9 points and 6 points represents a meaningful increase for activities of daily living (ADL) and sports subscales, respectively.[14] It is interesting to note that even though the patients scored > 15% change in function with ADL and sports, only 2 patients (patient # 2 and #3) scored a point difference higher than 9

Table 4. Hip Outcome Score Results

	Activities of Daily Living			Sports Subscale		
Patient #	Number of Questions Answered out of 17 total	Point Difference between Initial Evaluation & Discharge	Individual Self-Reported % Change	Number of Questions Answered out of 9 total	Point Difference between Initial Evaluation & Discharge	Individual Self-Reported % Change
1	17/17	2	10	6/9	2	25*
2	15/17	9*	10	9/9	1	-20
3	15/17	24*	15*	9/9	18*	25*
4	17/17	3	70*	9/9	2	9
5	17/17	1	0	5/9	1	10
6	13/17	3	8	4/9	1	0
7	16/17	-3	na	4/9	-2	na
8	8/17	0	0	1/9	2	50*
10	16/17	6	45*	6/9	7*	45*
Average	14.89/17	1.71	5.60	5.89/9	1.00	-0.25
Std. Dev.	2.89	2.81	5.18	2.76	1.41	13.91

* Statistically significant finding $p < 0.05$

1741_OP.indd 150 7/1/10 10:42 AM

points for ADL and 2 patients (patient # 3 and # 10) scored a point difference higher than 6 points. Further review of each item revealed that 4 patients (patients # 1,5,6,8) scored very high with their initial survey so that they could not improve by the necessary points to be minimally clinically significant. It should be noted that the patients in this study were not able to complete the survey, and there were items that were left blank.

CONCLUSION

It is our belief that we can offer patients improved clinical and personal outcomes after hip labral tears without using any surgical treatments. Through a comprehensive physical therapy exam that focused on addressing the source of each patient's problem rather than just the symptoms, we believe we can offer a better alternative to surgery and not only improve their outcomes but also decrease the amount of time necessary to return them to their normal level of activity. A future prospective study will include video evaluation of lower extremity kinematics while running, pain monitoring using visual analog scale, a step-down test, and/or a drop-jump test. More extensive patient self evaluations will also be included to give us better insight into the future of the treatment of labral tears without surgical intervention. The current study shows a pattern of success but further study is necessary to draw definitive conclusions.

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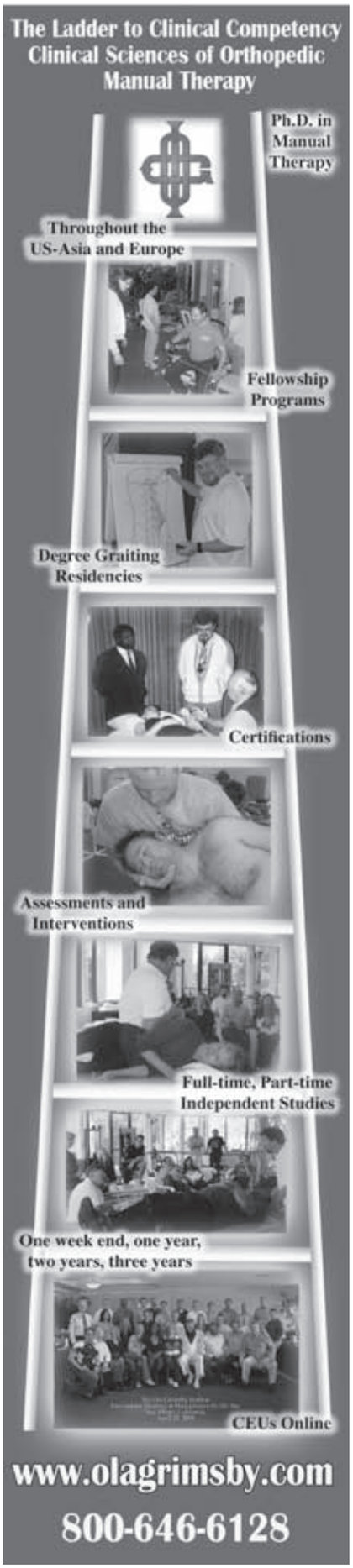
(Appendix 1 follows on page 152)



1741_OP.indd 151 7/1/10 10:42 AM

Please answer every question with one response that most closely describes your condition within the past week.
If the activity in question is limited by something other than your hip, mark not applicable (N/A).

Activities of Daily Living Subscale
Because of your hip how much difficulty do you have with:

	No Difficulty At All	Slight Difficulty	Moderate Difficulty	Extreme Difficulty	Unable To Do	N/A
Standing for 15 minutes	☐	☐	☐	☐	☐	☐
Getting into and out of an average car	☐	☐	☐	☐	☐	☐
Putting on socks and shoes	☐	☐	☐	☐	☐	☐
Walking up steep hills	☐	☐	☐	☐	☐	☐
Walking down steep hills	☐	☐	☐	☐	☐	☐
Going up 1 flight of stairs	☐	☐	☐	☐	☐	☐
Going down 1 flight of stairs	☐	☐	☐	☐	☐	☐
Stepping up and down curbs	☐	☐	☐	☐	☐	☐
Deep squatting	☐	☐	☐	☐	☐	☐
Getting into and out of a bath tub	☐	☐	☐	☐	☐	☐
Sitting for 15 minutes	☐	☐	☐	☐	☐	☐
Walking initially	☐	☐	☐	☐	☐	☐
Walking approximately 10 minutes	☐	☐	☐	☐	☐	☐
Walking 15 minutes or greater	☐	☐	☐	☐	☐	☐
Twisting/pivoting on involved leg	☐	☐	☐	☐	☐	☐
Rolling over in bed	☐	☐	☐	☐	☐	☐
Light to moderate work (standing, walking)	☐	☐	☐	☐	☐	☐
Heavy work (push/pulling, climbing, carrying)	☐	☐	☐	☐	☐	☐
Recreational activities	☐	☐	☐	☐	☐	☐

How would you rate your current level of function during your usual activities of daily living from 0 to 100, with 100 being your level of function prior to your hip problem and 0 being the inability to perform any of your usual daily activities?

☐☐☐.0%

Sports Subscale
Because of your hip how much difficulty do you have with:

	No Difficulty At All	Slight Difficulty	Moderate Difficulty	Extreme Difficulty	Unable To Do	N/A
Running one mile	☐	☐	☐	☐	☐	☐
Jumping	☐	☐	☐	☐	☐	☐
Swinging objects like a golf club	☐	☐	☐	☐	☐	☐
Landing	☐	☐	☐	☐	☐	☐
Starting and stopping quickly	☐	☐	☐	☐	☐	☐
Cutting/lateral movements	☐	☐	☐	☐	☐	☐
Low impact activities like fast walking	☐	☐	☐	☐	☐	☐
Ability to perform activity with your normal technique	☐	☐	☐	☐	☐	☐
Ability to participate in your desired sport as long as you would like	☐	☐	☐	☐	☐	☐

How would you rate your current level of function during your sports related activities from 0 to 100, with 100 being your level of function prior to your hip problem and 0 being the inability to perform any of your usual daily activities?

☐☐☐.0%

How would you rate your current level of function?
☐ Normal ☐ Nearly Normal ☐ Abnormal ☐ Severely Abnormal

Scoring Instructions
A score is generated separately for the ADL and sports subscales. The item related to sitting and the item related to putting on socks and shoes are not scored. The response to each of the other 17 items on the ADL subscale is scored from 4 to 0 , with 4 being "no difficulty" and 0 being "unable to do." A response of not applicable (N/A) is also an option when the item in question is limited by something other than the individual's hip pathology. Responses of "N/A" are not figured into the scoring. The scores for each of the items are added together to get the item score total. The total number of items with a response is multiplied by 4 to get the highest potential score. If the subject answers all 17 items, the highest potential score is 68. If 1 item is not answered, the highest score is 64; if 2 are not answered, the total highest score is 60; and so on. The items score total is divided by the highest potential score. This value is then multiplied by 100 to get a percentage. The 9-item sports subscale is scored in the a similar manner. A higher score represents a higher level of physical function for both the ADL and sports subscales.

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Appendix I. Hip Outcome Score

1741_OP.indd 152 7/1/10 10:42 AM

Pregnancy-related Pelvic Girdle Pain Presenting as Low Back Pain: A Case Report

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ABSTRACT

Background: Lumbopelvic pain affects 45% of all pregnant women, 25% of whom will endure lasting symptoms. Determining a diagnosis in this population is challenging. As a result the conditions can go unrecognized or untreated, leading to chronic pelvic related pain. **Case Description:** The evaluation and management of a 48-year-old female presenting with chronic low back pain and a 6-month history of unrecognized lumbopelvic pain is described. The patient was treated 21 times over 6 months using mechanical principles for lumbar spine and lumbopelvic dysfunctions while incorporating a cognitive behavioral approach. **Outcomes:** Numeric pain rating scale and change in functional abilities were used to measure progress. **Conclusion:** Mechanical lumbopelvic conditions, chemical sensitization, and a psychosocial component were identified from the clinical examination. Management of the patient as a "whole" is described and included: manual therapy; motor control exercise targeting the deep abdominal, breathing, and pelvic musculature; a lumbopelvic belt; and cognitive behavioral strategies.

Key Words: low back pain, pelvic pain, pregnancy

BACKGROUND

Pregnancy-related pelvic girdle pain is pain that begins during or in the immediate postpartum period and is located in the pelvis.[1] Possible causes of this pain condition include sacroiliac joint dysfunction, lumbar disc or joint pathology, symphysis pubis dysfunction, muscular and ligamentous overload, and that of a nonmechanical origin. Because of the possible multiple causes, determining the source of pelvic pain can be challenging to diagnose and treat effectively.

This case report describes the examination findings for a patient presenting with unusual prolonged pregnancy-related pelvic girdle pain, discusses the process for identification of the pain generator and areas of dysfunctions, and describes an evidence supported approach to management.

CASE DESCRIPTION

A 48-year-old self-employed female was referred to physical therapy for evaluation and treatment of low back pain. She reported a 3-month history of constant 3/10 intensity pain in the right low back area that was attributed to an episode of repetitive lifting (Figure 1). She also noted a 6-month history of lower abdominal/pelvic pain of unknown etiology as work-up by her internist and gastroenterologist was negative for specific disease but diagnosed as irritable bowel syndrome. She did not have any recent imaging of her spine or pelvis. Her work from home required extensive hours of sitting at a computer that exacerbated both pain areas. Lumbar pain was increased when rising from sitting, dressing the lower limbs, standing greater than 15 minutes, and when turning in bed. The abdominal pain was increased with sitting, eating certain foods, during times of stress, and if constipated. She reported being limited to 25% of her normal cross-country skiing activity and was unable to visit friends and family due to sitting discomfort with long plane or car trips. She stated she desired to engage in these activities within the current winter season.

The patient reported her initial episode of low back pain 2 years previously due to moving and taking a long car trip. She stated this resolved with physical therapy. Her past medical history was significant for: (1) 12-year history of rheumatoid arthritis primarily affecting the hands, (2) prior whiplash injury for which she would occasionally receive chiropractic adjustments (1-2x monthly), (3) temporomandibular joint dysfunction with use of night splint with benefit, (4) irritable bowel syndrome--recently diagnosed, (5) 2 prior vaginal deliveries without complication, and (6) long standing history of depression. She was

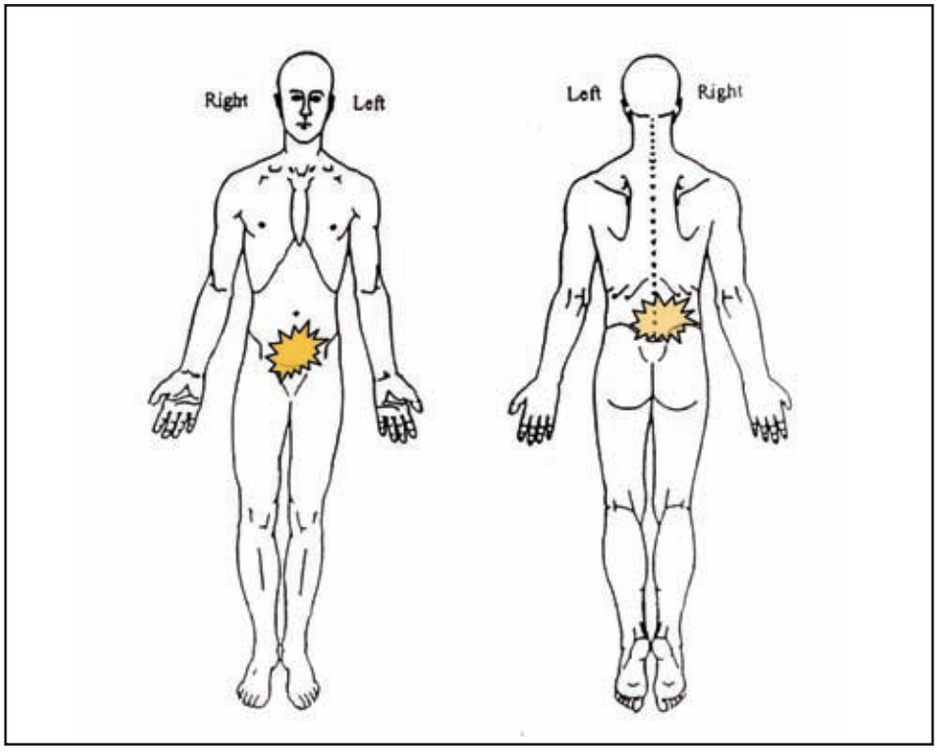

Figure 1. Pain location.

1741_OP.indd 153 7/1/10 10:42 AM

Table 1. Lumbar Spine Clinical Examination

POSITION	TEST	FINDING
STANDING	Observation	Relaxed abdominal wall; increased extensor oblique tone; upper chest respiratory pattern, mild increase lumbar lordosis
	Extension	Mild loss, no pain
	Left sidebend	Full, no pain
	Right sidebend	Full, no pain
	Forward flexion	Full, 3/10 pain on return and crawls up legs for assist
	Forward flexion with cervical flexion	No change in pain
	Unilateral toe raises	5/5 right and left
	Heel walk	5/5 right and left
SITTING	Slump test	Provokes left and midline low back pain, improved with DF release
SUPINE	SIJ provocation dorsolateral	Negative
	SLR	Provokes low back pain
	SLR with cervical flexion	No change in pain
	Passive hip flexion	Full, provokes mild hip pain at end range bilaterally
	Passive hip internal rotation	Full, no pain
	Passive hip external rotation	Full, Right provokes mild end range pain
	Resisted hip flexion, L2,3	R: 4+/5; mild groin and symphysis pain L: 4/5; 8/10 groin and symphysis pain and giving way
	Resisted tibialis anterior, L4	5/5 bilaterally
	Resisted great toe extension, L4,5	5/5 bilaterally
	Resisted peronei, L4,5,S1	5/5 bilaterally
	Patellar tendon reflex, L3,4	+2
	Foot sole reflex (Babinski)	Negative
	Sensory testing : light touch	Intact to all dermatomes
SIDELYING	SIJ provocation ventromedial	Negative
	Femoral nerve stretch, L3	Negative (position provoked groin/symphysis pain but unchanged with neck flexion or extension)
PRONE	Achilles tendon reflex, L5, S1,2	+2
	Resisted knee flexion, S1,2	5/5 R, 5-/5L; Provokes mild groin and symphysis pain bilaterally
	Resisted knee extension, L3,4	5/5
	Resisted gluteus maximus, S1,2	
	Springing test	Increased motion L5. Severe back pain L3, moderate back pain L4, mild back pain L5.
	Instability test	Back pain improved at all levels
EXTRA TEST	Resisted SB; Left and Right	5/5 to right and left without pain
	Prone segmental rotation	Increased L5S1 left rotation
	Valsalva Test	(+) for low back pain

medicated to manage the above conditions, knowing several medications caused side effects of gastrointestinal distress.

The history provided by the patient suggested a local lumbar condition so the decision was made to proceed with a lumbar spine examination. The differential diagnosis list included: (1) lumbar disc disease, (2) facet syndrome, (3) sacroiliac joint dysfunction, and (4) lumbar hypermobility syndrome with pain.

CLINICAL EXAMINATION

The outcome of the clinical examination tests are listed in Table 1. The positive examination findings/impairments are summarized in Figure 2. Pregnancy-related history was discussed in greater detail due to severe groin pain that was provoked with resisted hip flexor testing and the lack of recent fall or other trauma that might disrupt the pelvic girdle. Patient was questioned about her two pregnancies in terms of pain during or after delivery, prolonged second stage (pushing) of labor, or postdelivery incontinence. She reported a normal first pregnancy but a prolonged pushing stage during delivery of her second child with significant symphysis pubis pain. She recalled difficulty walking and constant pubis pain for the first month postpartum and intermittent pain for an additional 6 months. She did not recall any specific assessment or treatment for this pain. She also recalled a short-term episode of stress incontinence that resolved after 6 weeks. She denied further difficulty with continence.

Due to the additional history provided, the lack of recent traumatic injury to the pelvic girdle, and the unusual findings of significant pubic pain provoked with resisted hip flexion, a suspicion of pregnancy-related pelvic girdle pain as an underlying contribution to the lingering lumbar pain was made and the key clinical examination tests to identify this condition completed (see Table 2).

INTERPRETATION OF THE CLINICAL EXAMINATION FINDINGS

As the disc is one of the primary restraints to sagittal plane movement, disc pathology will likely be most provoked

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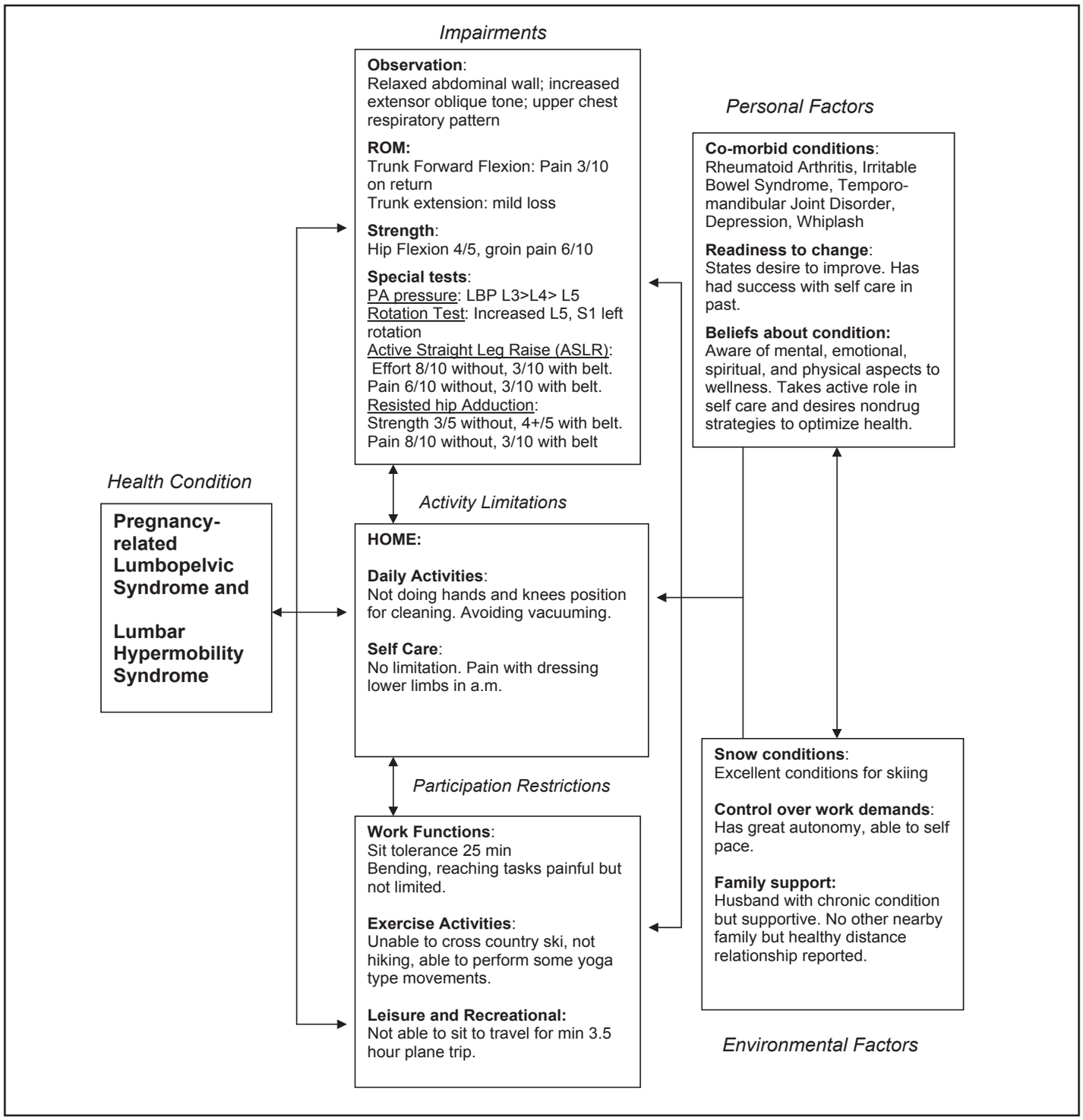

Figure 2. ICF summary of examination findings and factors to consider for prognosis.

during flexion or extension movements of the lumbar spine, which was the case with this patient. These assumptions were confirmed by a positive slump and straight leg raises that both reproduced back pain.[2,3] The use of posterior-anterior (PA) pressure on the spinous processes of the lumbar vertebrae helped determine the painful segment as well as identify potential increases in mobility. The prone instability test and a catch with return from flexion have been suggested as a means to confirm an increase in lumbar segmental mobility.[4] None of the sacroiliac joint provocation testing was positive, which ruled out a sacroiliac joint condition.[5,6] Differential diagnosis of the pubic pain was performed using resisted hip adduction (Figure 3), which is useful to evaluate dysfunctions of the pubic symphysis in patients with pregnancy-related pelvic girdle pain.[7] The active straight leg raise (ASLR) was used to identify a 'load transfer dysfunction' through the pelvis.[8,9] Both the resisted hip adduction and ASLR tests were positive and improved with the use of a pelvic belt or compressive support to the pelvis, which is indicative of pelvic girdle dysfunction (Figures 4A-B).

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Table 2. Pelvic Girdle Pain Differential Clinical Examination Findings

POSITION	TEST	FINDING
SUPINE	FABER test Left	+ Left groin and pubic/ suprapubic pain
	Hip scour	Negative
	Resisted hip adduction: No belt	Strength: 3/5; Pubic pain: 8/10
	Resisted hip adduction: With belt	Strength: 4+/5; Pubic pain 0/10
	Active straight leg raise (R+L)/10: No belt	Effort: 8/10; Pubic pain 6/10, low back pain 2/10 Left leg
	Active straight leg raise (R+L)/10: With belt	Effort: 5/10: Pubic pain 3/10; low back pain 0/10 Left leg

DIAGNOSIS AND ASSESSMENT OF IMPAIRMENT

Based on the findings in this case, the primary diagnosis was pregnancy-related lumbopelvic syndrome with a co-morbid lumbar hypermobility syndrome. Key findings related to this diagnosis were the significant groin pain provoked with resisted hip flexion testing, lack of significant pelvic pain provoked with lumbar examination, lack of recent trauma, and additional positive findings with assessment of the pelvic girdle with a positive ASLR and resisted adduction tests. Results of the impairments, activity, and participation restrictions based on the ICF model[10,11] are summarized in Figure 2. The environmental and personal factors were used to make a prognosis statement (see Figure 2).

PROGNOSIS AND PLAN OF CARE

Prognosis was good for the patient to return to skiing for the current season and work-related tasks with minimal symptom increase while using a pelvic belt, and the ability to perform all work-related tasks as well as ski the following season without symptoms' flare up and without need of the belt.

INTERVENTION

Due to the chronic nature of the patient's pelvic girdle condition a Cognitive Behavioral Therapy (CBT) framework that emphasizes the patients' role in identifying clear treatment goals, and to actively focus on implementing positive, forward focused behaviors and attitudes over a specific time frame.[12] Examination findings, treatment strategies, and prognosis for each of the mechanical conditions as well as the multifocal pain symptoms' were discussed to provide a thorough explanation of the condition and set the path for active patient participation.[13] Interventions were directed to address the local stabilizing musculature for the lumbar spine and pelvis, correct the dysfunctional pattern of posture and breathing, and resolve the mechanical conditions in the lumbar spine and symphysis pubis.

Diaphragmatic breathing (DB) was taught for use as an active behavior to manage pain by way of self regulation and relaxation.[14,15] The patient was asked to identify 5 to 6 additional activities that encouraged the same pacing, self regulation, and pain management response and use these on planned intervals throughout the day.

Use of a pelvic support belt was offered to improve force closure and reduce the stress on the soft tissue structures supporting the sacroiliac and symphysis pubis joints.[16-18] The patient chose this option due to the immediate improvement in pain and strength during clinical tests as well as during functional movement trials in the clinic. Instruction was full-time use for one week, then waking hours for the next several months. The rationale for this prescription was to allow ligamentous adaptation to improve passive support. Thus, at least 14 weeks was deemed necessary.[19]

Pain relieving techniques for the lumbar spine condition included local soft tissue mobilization and 3-dimensional axial separation targeting the lumbar spine (a unilateral manual traction performed with patient in a sidelying position, painful side up, and emphasis on sidebending the pelvis away from the shoulders in a axial direction).[20] Instructions in self care measures specific to the lumbar spine included: (1) ergonomic training to minimize flexion postures and activities in the first 4 hours after sleep,[21] (2) 10 to 30 minutes of aerobic type movement daily when first awakening, (3) utilization of gravity eliminated posture (ie, laying recumbent, recline sitting) for 10 to 30 minutes at planned intervals as the day progressed, and (4) incorporation of sustained local stabilizing muscle activation focused training in this gravity eliminated posture 3x daily.

Progressive stabilization and motor con-

Figure 3. Resisted hip adduction test.

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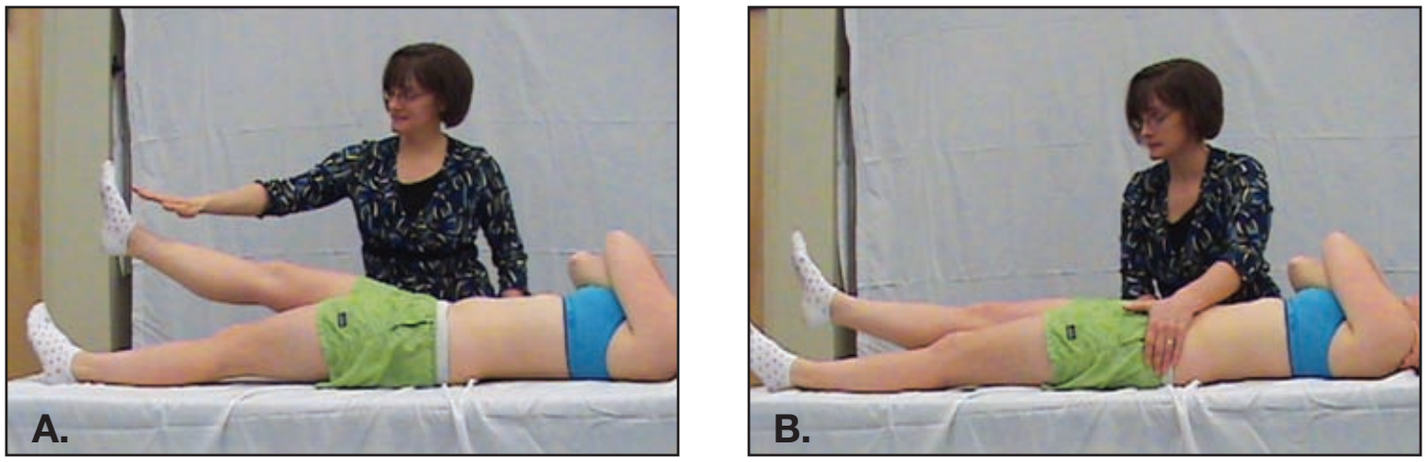

Figure 4. A. Active straight leg raise test without pelvic support; B. Active straight leg raise test with pelvic support.

trol training was added incorporating the model of Sapsford.[22] Once patient demonstrated proper diaphragmatic breathing and chest wall excursion patterns, progression to controlled low level, sustained contractions of the local stabilizing muscles was incorporated [Transverse Abdominis (TrA), then pelvic floor contraction with diaphragmatic breathing and TrA]. In addition, maximal intensity, short duration contractions were included with specific attention to the pelvic floor as an assist to force closure.[23] As the patient was successful with focused muscle activation, progression to functional challenges such as bending, lifting, sitting, and twisting was made. Further challenges such as coughing, sneezing, vacuuming, and ski simulation occurred as the patient progressed in her mastery.

OUTCOMES

The patient was treated for 21 sessions over 6 months (3 times weekly for 2 weeks, twice weekly for 3 weeks, once weekly for 3 weeks, then every 1-3 weeks). The patient had resolution of back pain with work-related tasks and normal activities of daily living after the first month, and was able to return to skiing after 6 weeks at 50% duration without flare-up with use of the pelvic belt. She continued to use the belt for 16 weeks during waking hours, then decreased use to exercise and while grocery shopping, and during more demanding household cleaning days for the remainder of her 6-month treatment time.

At discharge the patient had resumed her typical daily activities, traveled to visit her family without a flare-up, and reported full resolution of her low back and symphysis pain. She continued to have suprapubic pain that seemed related to irritable bowel syndrome but reported faster return to normal activities after a flare-up. She attributed such improvement to: (1) her consistent use of relaxation strategies, (2) her improved understanding of multifactoral pain, (3) knowledge of the interaction of her affective state on her pain level, and (4) improved strength of key trunk and pelvic muscles.

DISCUSSION

This is the first case report of a patient presenting with delayed recognition of pregnancy-related pelvic girdle pain referred to physical therapy with a diagnosis of low back pain. As the pregnancy-related symphysis pain was never addressed and the patient did not suffer any significant trauma to bring on the lumbopelvic pain, it is likely that the pelvic girdle pain was related to the postpartum condition that never fully resolved. If the lumbar spine condition would have been addressed only, the patient would probably not have recovered as fully and quickly as she did. As physical therapists, we are trained to manage musculoskeletal conditions and recognize the interaction of such conditions with other body systems. Such interactions require diligence in correcting the underlying movement patterns that contribute to nonresolution of symptoms, as well as in addressing the patients' concerns and in implementing a rehabilitation program that takes into consideration the whole person. For women with painful pelvic girdle conditions, this process can be important to maximize quality of life.[24]

The use of both mechanical and cognitive behavioral methods, as demonstrated in this case, can optimize patient function. This case report could have been strengthened by the use of validated intake questionnaires such as the SF-36, Tampa Scale of Kinesiophobia (TSK-11), and Fear Avoidance Belief Questionnaire (FABQ), which help objectify patients with central pain processing or emotional overlay components that can impact on the recovery. The treatment was based on the CBT model that emphasized the patient as an active participant in the recovery, using a program that is present focused, structured, and time limited.[12]

Physical therapist practitioners are well suited to implement this model as every patient receives an evaluation of current function that should be used to set time limited and functionally oriented goals that guide interventions. For patients who are ready to be agents of change, we can guide the new behavior until it is self-sustaining. For those in the precontemplative or contemplative stages, providing the patient specific information about their condition as well as the behaviors and interventions that improve health status may assist the patient in moving to a more active stage and create educated health care consumers.[25]

O'Sullivan and Beales[26] describe a system of patient classification that can help delineate a local pelvic girdle pain problem from a centrally mediated pelvic girdle pain. Key in the diagnostic process is pain provoked with mechanical testing with treatment directed at correcting the mechanical dysfunction. The active straight leg raise test and resisted adduction tests were included in the pelvic girdle examination as these are both mechanical provocation tests as well as tests that measure disease severity.[27] In this case, the most severe pain was provoked with mechanical tests of the pelvic girdle and a pregnancy-related lumbopelvic

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syndrome was diagnosed. Despite the presence of irritable bowel syndrome, depression, and rheumatoid arthritis, this patient responded well with emphasis on mechanical interventions, use of a pelvic belt, and graduated muscular strengthening and endurance training. If the patient would not have demonstrated the mechanical findings on examination, the focus of treatment would have shifted to emphasize systemic pain relieving self-management strategies, pacing, and graduated exercise in addition to encouraging the patient obtain psychological support to enhance the likelihood of successful outcome.[28]

CONCLUSION

Women who present with low back and buttock pain, and for whom the pattern of tests and measures does not follow a classic presentation, deserve consideration of related pathologies that can contribute to ongoing overload of the painful area(s). The addition of pelvic pain to a lumbar spine condition requires further examination of the pelvic ring, and assessment of the psychosocial aspects associated with chronic pain conditions. Managing patients without considering these associated conditions may limit the patients' optimal recovery. Enhancing treatment for the 'whole' patient through application of treatments directed at each component identified in the clinical exam was the focus of this case report.

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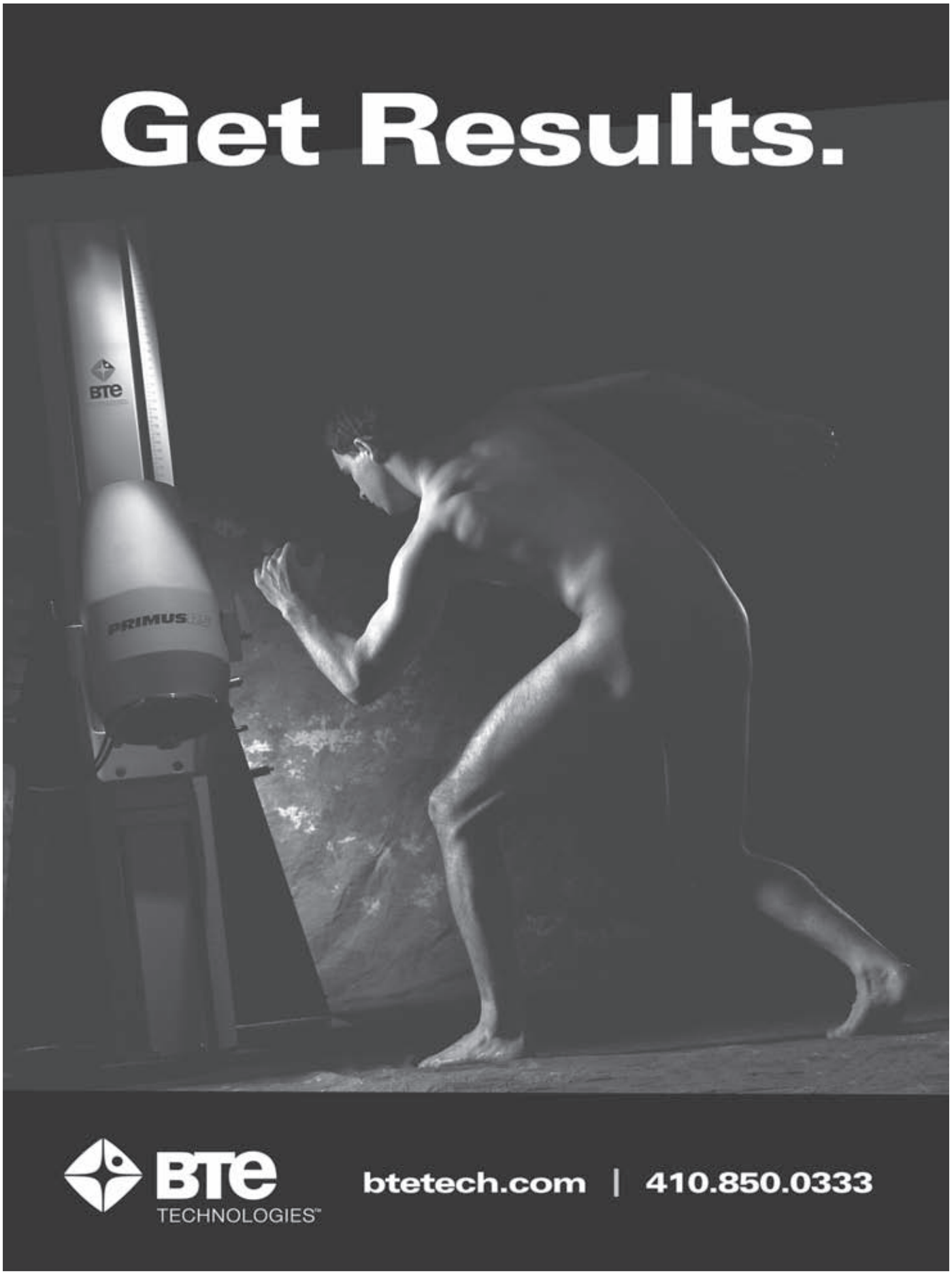

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The Role of the Physical Therapist in Implementing A Firefighter Wellness Program

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ABSTRACT

Background and purpose: Physical performance requirements for firefighters with regard to strength and aerobic and anaerobic endurance are high. However, cardiovascular mortality and musculoskeletal morbidity is high and partly due to modifiable lifestyle related risk factors. The goal of this paper is to share the primary author's personal experience with setting up and managing a wellness intervention for the local fire department with the intent of informing other colleagues, who want to become active in this area of practice. **Methods:** Discussion of program content and results but also obstacles encountered along the way. **Findings:** Despite some unexpected obstacles, it would seem that the wellness program as it was implemented resulted in both increased levels of fitness for individual participants and considerable savings for the fire department. **Clinical Relevance:** Physical therapists seeking to expand services into the wellness area are ideally positioned to work to enhance firefighter wellness but they need to be aware of and deal with obstacles to implementation of a wellness program.

Key Words: wellness, firefighters, physical therapy, implementation, obstacles

INTRODUCTION

There are approximately 800,000 volunteer and 300,000 career firefighters serving their communities in the United States.[1] Physical requirements to adequately perform this vocation are very high. A generic job description holds that firefighters need to be able to stand and walk for an extended period of time, bend, stoop, push, pull, reach overhead, and carry a 200 lb person.[2] Providing more quantitative information, based on an analysis of demanding firefighter operations Gledhill & Jamnik[3] recommended a minimum VO2max of 45 ml/kg/min for firefighters. Based on a simulated person rescue exercise, Von Heimburg et al[4] proposed a minimum VO2max of 4 l/min. During high-intensity tasks firefighters also depend on high levels of anaerobic endurance.[5] In fact, anaerobic endurance as measured by a 400m run was found to highly correlate (r = 0.79) with overall job performance.[6] Not surprisingly, strength requirements are also high. Performance on a functional assessment tool specific to firefighting showed strong positive correlations with grip strength, maximal number of pull-ups and push-ups, and number of sit-ups performed in one minute.[7] Von Heimburg et al[4] noted that especially greater upper extremity strength led to increased functional performance.

In light of above physical requirements, data on firefighter fitness are likely surprising. With overweight defined as a body mass index (BMI) > 25 and < 30kg/m2, 60% of firefighters can be classified as overweight.[8] This is not a situation unique to the US fire service: A Canadian study reported that 9 ± 1% of firefighters was above the upper limit of ideal weight and that 53% had a BMI indicative of excessive weight. This study also found that in the participating firefighters HDL levels were lower and LDL and triglyceride levels were higher than the age-matched national average with total cholesterol levels considered indicative of the need for intervention.[9] However, factors other than these modifiable risk factors attributed to lifestyle also put firefighters at risk for cardiovascular disease. Occupational exposure to carbon monoxide has been implicated in the etiology of ischaemic myocardial damage and accelerated atherosclerosis and in the increased incidence of ventricular fibrillation.[10] Decreased ventilatory capacity has been directly correlated with exposure to firefighting action.[11] Therefore it should come as no surprise that of the 1,141 deaths between 1994-2004 in firemen while on duty (not including the 345 NYCFD firemen, who died on September 11, 2001), 50% of the volunteer firemen and 39% of career firemen were related to heart attacks. Furthermore, this most prevalent cause of death occurred most commonly in the 45 to 54 year old group.[1] Musculoskeletal injuries are also highly prevalent. For 2007, the National Fire Protection Agency (NFPA) estimated that 80,100 firefighters were injured with 52% of these injuries classified as sprains, strains, and muscular pain.[12]

At the national level within the fire service, firefighter fatalities due to sudden cardiac death with a large percentage also occurring off the fire ground have been recognized as a problem; and in 1997, a collaborative effort called The Fire Service Joint Labor Management Wellness/Fitness Initiative was started by the International Association of Fire Fighters (IAFF) and the International Association of Fire Chiefs to address this problem.[13] With the provision of wellness services clearly established within the scope of practice of physical therapy in the United States[14] and considering the potential of addressing the modifiable risk factors for both cardiovascular and musculoskeletal pathology prevalent in firefighters, physical therapists are well placed to be active in this area. The goal of this paper is to share the primary author's personal experience with setting up and managing a wellness intervention for the local fire department with attention to program content and results and obstacles encountered along the way with the intent of informing other colleagues, who want to become active in this area of practice.

PROGRAM CONTENT

In 2006 the primary author won a bid to develop and implement a wellness program for the local fire department. The program had 4 components: baseline and follow-up testing, a circuit-training program, a cardiovascular training program, and an educational component. If a participating firefighter had been cleared to work, they were considered able to participate in the program.

1741_OP.indd 161 7/1/10 10:42 AM

Baseline tests were the tests contained in the Candidate Physical Ability Test (CPAT) that has been described in The Fire Service Joint Labor Management Wellness/Fitness Initiative.[13] The CPAT consists of a comprehensive medical examination and a number of anthropometric and physical performance tests including resting blood pressure and heart rate, height, weight, The Siconolfi step test, 1-minute push-up, pull-up test, and sit-up tests, and the sit-and-reach flexibility test. Test results were discussed with participants and used in individualized goal setting. Firefighters were given the opportunity to be retested every quarter.

Mindful of the limited budget for purchase of exercise equipment and the fact that in this fire department alone 23 separate fire stations participated, each with 3 shifts, strength and anaerobic endurance requirements were addressed with a circuit-training program modeled after the Los Angeles Fire Department FFIT (Fire Fighter in Training) program that was developed in cooperation with the University of California at Northridge. The program included 24 one-minute stations alternating strength training with stretching exercises with 45 seconds to exercise and 15 seconds for switching stations. The whole circuit was to be completed twice during one workout session (Table 1). The participants stretching kept time calling out 20 seconds to switch sides when stretching and 45 seconds to change stations. Strength training exercises were chosen to specifically address muscle groups found in EMG studies to be most involved in firefighting activities.[15] Weight was self-adjusted by the participants with the intent of producing muscular fatigue at 45 seconds. The primary author provided poster boards with pictures and descriptions of all exercises and came to the fire stations upon request for additional instruction.

Because the circuit-training program did not produce an adequate cardiovascular training stimulus, a separate aerobic endurance was added. Again, participants were allowed to determine (and subsequently adjust) their exercise level using a bronze to platinum classification of self-rated aerobic fitness (Table 2) to which aerobic endurance activities were matched (Tables 3 and 4). Based on the retest results of the Siconolfi step test, the therapist also made recommendations on exercise level. The aerobic program was modeled on the requirement that a firefighter has to be able to run approximately 2 miles in 15 minutes, which is how long a compressed air bottle will last on average during firefighting action.

Optional for incumbents, the educational component required all cadets and new recruits to attend a class conducted by an exercise physiologist going over the firefighter fatality database and the CDC statistics on obesity and its impact on developing chronic diseases that might affect a fire fighter's career. The importance of starting and maintaining healthy exercise habits were discussed as well the role of good nutrition and a healthy lifestyle.

PROGRAM RESULTS

Of 230 firefighters, 186 (81%) participated in the baseline testing. Compared to relevant normative data,[16] average values for the physical assessment tests were depressed for the Siconolfi step test, 1-minute pull-up test, and sit-and-reach test; BMI was elevated. Blood pressure measurements showed that at baseline testing 44% of participants were pre-hypertensive (>120-139 mmHg systolic and/or 80-89 mmHg diastolic), 30% had stage I hypertension (140-159 mmHg systolic or 90-99 mmHg diastolic), and 3% were stage II (>160 mmHg systolic or >100 mmHg diastolic).[17] At follow-up testing, 110 firefighters (48%) participated. Baseline and follow-up testing data are provided in Table 5.

To determine economic impact, the primary author used data from the county Department of Risk Management that provided reports related to workers compensation injuries on the year prior to the initiation of the wellness program and for the year during which the wellness program was implemented. This year-to-year comparison showed a decrease in days lost by 41%, a decrease in claims by 19%, and a decrease in cost by 69% or $85,621.41 during the first year of the program (Figure 1). Recognizing the likelihood of confounding factors, we extended this comparison to the 4 years prior to implementation of the wellness program. Over this 5-year period, the total potential savings including backfill costs to replace the injured firefighters during their shift and excluding benefits was $349,084.40 (Figure 1). Although it was obvious that these savings could not be directly attributed in a cause-and-effect sense to the wellness intervention, this trend did provide sufficient support for continuation of the program.

Table 1. Circuit Training Program

Flexibility	Strength
1-Hamstring Stretch	2-Lunge Carry
3-Triceps Stretch	4-Push-up
5-Low back Stretch	6-Oblique Crunch
7-Quadriceps Stretch	8-Squat Press
9-Trunk Stretch	10-Horizontal Pull-up
11-Low Back/Cat Stretch	12-Back Extension
13-Groin Stretch	14-Lunge Carry
15-Chest Stretch	16-Push-up
17-Hips and Gluteal Stretch	18-Oblique Crunch
19-Lunge Hip Flexor Stretch	20-Squat Press
21-Posterior Shoulder Stretch	22-Horizontal Pull-up
23-Rotation-Low Back Stretch	24-Back Extension

Table 2. Self-Rated Aerobic Fitness Classification

	Bronze	Silver	Gold	Platinum
Current exercise level	3 or more days per week	3-5 days per week	5 or more days per week	5 or more days per week with interval training
Target heart rate (age predicted maximum)	60-70%	70-80%	70-90%	70-90%
Predicted VO_2max	26-33ml/kg/min	34-43ml/kg/min	44-52 ml/kg/min	53 ml/kg/min

1741_OP.indd 162 7/1/10 10:42 AM

OBSTACLES AND LIMITATIONS OF PROGRAM IMPLEMENTATION

Implementation of the wellness program encountered a few obstacles. At baseline testing the therapist had no access to findings from the medical examination because firefighters were concerned that disseminating such data might negatively affect their active duty status. The primary author had to establish relationships with fire chiefs and other administrators, the union, and the firefighters to gather some data that would not violate HIPAA privacy rule regulations yet still provide for establishing safe testing limits. Approval was given to have participants fill out a personal fitness and lifestyle goals questionnaire and an exercise habits and interest questionnaire both to gain insight into exercise history and to help tailor the program somewhat to exercise interest of the participants.

With regard to basic medical information and as noted in the program content section, the initial instruction was that if the individual had been cleared to work, that they should be considered able to participate in this program. Concerned that this was insufficient information to assure safe testing and participation, the primary author was able to get permission to have participants fill out the Physical Activity Readiness Questionnaire (PAR-Q), which has been proven reliable for flagging individuals between the ages of 15-69, who need to see a physician before beginning the testing or exercise components of this program.[18] If any participant had a positive variable on the PAR-Q, he or she had to receive medical clearance before participating in the fitness program testing. If the item scored was of a musculoskeletal nature, the therapist evaluated the individual to determine if participation was safe or needed modification. Most firefighters who had a finding on the PAR-Q requiring a referral did follow up with a physician.

The most significant obstacle had to do with the unexpected elevated blood pressure findings. The department had to come up with a policy regarding testing and exercise participation. It was decided that a firefighter with stage I hypertension was not to be further assessed, his district captain notified, who then together with the health and wellness officer determined impact on active duty status. A firefighter with stage II hypertension was sent to the employee health clinic, where duty status was then determined. With 33% of initial participants registering as stage I/II hypertensive, we suddenly had a large number of firefighters not wanting to participate fearing that they would be taken off duty. Letters from the local IAFF union president, medical director, and division and fire chiefs were solicited to assure participants that the findings would not result in punitive action and that the wellness program was in the best interest of the firefighter and proposed as a nation-wide initiative by *The Fire Service Joint Labor Management Wellness-Fitness Initiative*.[13] To an extent, this helped set aside fears and testing. Exercise participation continued, although it certainly may have affected long-term participation as noted by the decreased participation rate at retesting.

Table 3. Cardiovascular Walk-to-Run Training Program Bronze and Silver Levels

1. Slow walk for two miles in 40 minutes.
2. Alternate ¼ mile slow walk and ¼ mile fast walk for 36 minutes.
3. Fast walk for two miles in 32 minutes.
4. Alternate 330-yard fast walk and 11-yard slow jog for 29 minutes.
5. Alternate 220-yard fast walk and 220 yard slow jog for 26 minutes.
6. Alternate ¼ mile fast walk and ¼ mile slow job for 26 minutes.
7. Alternate ½ mile slow jog and ¼ mile fast walk for 23 minutes.
8. Alternate ¾ mile slow jog and ¼ mile fast walk for 23 minutes.
9. Slow jog continuously for 20 minutes.
10. Alternate ¼ mile fast jog and ¼ mile slow jog for 19 minutes.
11. Alternate ¼ mile slow jog and ¼ mile fast jog for 18 minutes.
12. Alternate ½ mile and ½ mile fast jog for 18 minutes.
13. Alternate ½ mile fast jog and ¼ mile slow jog for 17 minutes.
14. Alternate ¼ mile slow jog and ¾ mile fast jog for 16 minutes.
15. Fast jog continuously for 16 minutes.
16. Alternate ¼ mile fast jog and ¼ mile faster jog for 15 minutes.
17. Alternate ½ mile fast jog and ½ mile faster jog for 15 minutes.
18. Faster jog continuously for 14 minutes.

Table 4. Cardiovascular Interval Training Program Gold and Platinum Levels

	Activity	Time	Distance
1	Warm-Up		
2	Fast run	3:15-3:30	0.5 miles
3	Walking recovery	3:00	
4	Fast run	3:00-3:15	0.5 miles
5	Walking recovery	3:00	
6	Faster run	1:10-1:20	0.25 miles
7	Walking/jogging	3:00	
8	Faster run	1:00-1:20	0.25 miles
9	Walking/jogging	3:00	
10	Faster run	0:30-0:45	220 yards
11	Jogging	1:30	
12	Faster run	0:30-0:45	220 yards
13	Jogging	1:30	
14	Faster run	0:15-0:20	110 yards
15	Jogging	0:45-0:60	
16	Faster run	0:15-0:20	110 yards
17	Jogging	0:30-0:40	
18	Faster run	0:15-0:20	110 yards
19	Jogging	0:20	
20	Fastest run	0:10-0:15	55 yards
21	Jogging	0:20	
22	Fastest run	0:10-0:15	55 yards

CONCLUSION

Despite some unexpected obstacles it would seem that the wellness program as it was implemented resulted in both increased levels of fitness for individual participants and considerable savings for the fire department, although we recog-

1741_OP.indd 163 7/1/10 10:42 AM

nize that confounding factors abound and that a cause-and-effect relationship cannot be established. Key lessons learned by the primary author included the need for a greater emphasis within a wellness intervention on education with regard to modifiable life style-related risk factors due to the impact this might have on cardiovascular morbidity and mortality but also the need to work closely with local government officials, unions, fire service administration, and medical providers to maintain good communication. A proposed solution that would improve such communication and allay participant concerns would be to have an employee/peer from within the fire service coordinate this program. An individual who understands the inner workings of the fire service from job demands to job politics can act as a liaison between outside contractors, such as an exercise physiologist, physical therapist, or other medical providers, and the various entities involved in making decisions regarding a wellness program.

Physical therapists may seek to expand the services they offer into the area of wellness not only because it provides a source of revenue independent of shrinking third-party payer reimbursement but also because with their knowledge and expertise many are ideally suited to take this role (although some might consider additional training in the area of wellness and fitness). In 2002, an impact study of the *Fire Service Joint Labor Management Wellness-Fitness Initiative* was done in Florida.[19] This study found that the firefighters' mentality is that fatalities are the nature of their business. If fatalities are the cost of doing business, then the price paid by the Fire Service has been staggering. Nationally there are over 33,000 organized fire departments and historically the fire service has known more about the apparatus and equipment it purchases than about the firefighters who use it.[13] There is a role for the physical therapist in this regard to act as a much-needed advocate for change for the people who in serving our communities put their lives on the line.

ACKNOWLEDGEMENT

This paper was written in partial fulfillment of the requirements for the transitional Doctor of Physical Therapy degree of the primary author at the University of St. Augustine for Health Sciences. The authors would like to thank Ms. Deb Monkman, librarian for the Physiotherapy Association of British Columbia, for her help with retrieving references for this paper.

Table 5. Baseline and Follow-up CPAT Test Data

	Baseline	Follow-up	% Change
Scinolfi step test (ml/kg/min)	34.6	37.4	+8.1
Push-up test (reps)	33	38	+15.2
Sit-up test (reps)	47	62	+32
Sit-and-reach test (inches)	11.97	16.33	+36.4
Pull-up test	5	6	+20
Body Mass Index	27.3	27.6	+1.1

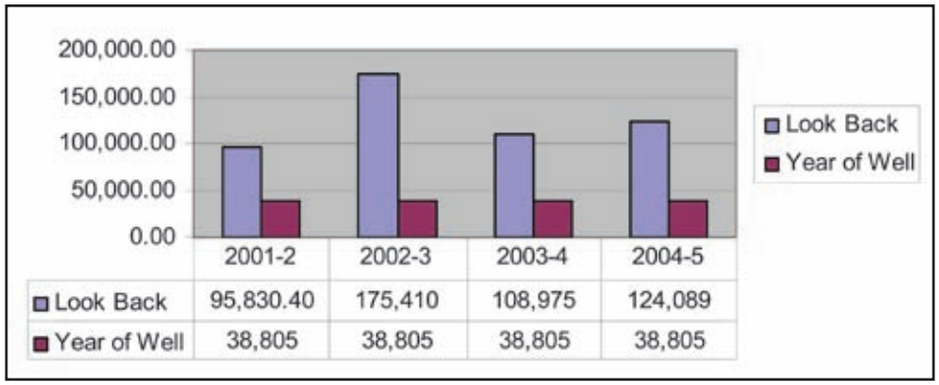

Figure 1. Cost comparison (in dollars) against year with wellness intervention.

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1741_OP.indd 164 7/1/10 10:42 AM

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CSM MEETING MINUTES ERRATUM

The CSM Meeting Minutes published in the last issue of OP will be corrected with the statement below.

Susan Appling, PT, PhD, OCS, PT-PAC Trustee, gave an update on the PT-PAC fund raising efforts. Susan explained that the Section cannot make contributions directly to the candidates but individual members of the Section can make contributions to the PT-PAC who can then contribute to the candidates.

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1741_OP.indd 166 7/1/10 10:42 AM

The Effect on Physical Therapy Outcomes When Treating Low Back Pain Versus Low Back Pain and Another Body Region: A Retrospective Study

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ABSTRACT

Background and Purpose: Patients seeking physical therapy care often have symptoms involving more than one body region. There is a lack of information regarding the effectiveness of physical therapy treatment in patients with multiple regions affected. The purpose of this study was to compare outcomes between patients with low back pain only (LBPO) and low back pain in addition to another body region (ABR). Cervical, upper and lower extremity clinical comparison diagnosis (CCD) groups were also used to compare to subgroups of the ABR group. **Subjects:** Charts from an outpatient physical therapy clinic were reviewed with 218 patients included in the LBO group and 85 patients included in the ABR group. Outcomes from 215 patients included in the clinical comparison groups were compared against the subgroups in the ABR group. Outcomes analyzed included the Numeric Pain Rating Scale, Oswestry Disability Index, total visits, Neck Disability Index (NDI), Penn Shoulder Score (PSS), and Lower Extremity Functional Scale (LEFS) as applicable. **Results:** Despite a greater number of visits in the ABR group, the LBPO group demonstrated a significant difference in Oswestry and pain scores at discharge. The mean Oswestry discharge score was 25.2 (17.6) in the LBPO group as compared to 42.8 (19.6) in the ABR group. The mean discharge pain score was 2.0 (2.2) for the LBPO group as compared to 4.9 (2.9) for the ABR group. The CCD cervical, upper and lower extremity groups also demonstrated greater improvement in disease specific outcome measures and pain at discharge when compared to the ABR subgroups, further supporting our hypothesis. **Discussion and Conclusion:** The results of this study support the hypothesis that patients demonstrate improved outcomes and report less pain at discharge when receiving treatment for one body region as compared to multiple regions. Further studies are needed to better understand the factors that may contribute to improved outcomes when treating low back pain only as compared to simultaneously treating low back pain along with another body region.

Key Words: low back pain, co-morbidities, outcome measures

INTRODUCTION

Research has documented that there is a high incidence of low back pain in the United States, with 26% of the adult population currently experiencing symptoms.[1-3] Low back pain is the second most common reason that people visit a physician's office.[4,5] Low back pain costs the American economy an estimated $75 to $90 billion a year, with the cost of treatment increasing each year.[6-8] Despite the high prevalence of this condition, difficulties effectively treating this population are well-documented.[8-11] In recent years improvements in outcomes have been made by identifying, grouping, and applying specific strategies to patients with common characteristics.[5,12-15] One factor not investigated to date is the effect on treatment outcomes when patients with low back pain and a second orthopaedic co-morbidity are concurrently treated.

Co-morbidities are commonly found to be present in patients with low back pain.[16,17] Holmstrom found combined low back and hip problems; low back and knee injuries; and low back, hip, and knee injuries in manual handling workers.[17] Leboeuf-Yde found coexisting low back and neck problems.[18] For therapists in the clinic treating patients with multiple body regions, there is limited information on the effectiveness of physical therapy intervention when treating low back pain coupled with a second orthopaedic injury. We hypothesized patients with both a low back injury and a secondary injury do not demonstrate as great of improvements in function and pain as compared to patients with a low back injury only. The purpose of this study was to retrospectively compare discharge outcomes after outpatient physical therapy in patients with low back pain only (LBPO) and those with low back pain plus an additional diagnosis in another body region (ABR).

METHOD

Search Strategy

A search of Cochrane Library, Medline, PubMed, Pedro, and Cinahl from 1980 to the present was undertaken. Terms used included: physical therapy, low back pain, injuries, multiple injuries, multiple treatments, rehabilitation, orthopaedic rehabilitation, outcome measures, multiple joints, musculoskeletal injuries, therapeutics, and treatment of multiple injuries. This search did not locate any published papers that addressed outcomes related to treating low back pain versus low back pain and another body region.

SUBJECTS AND PROCEDURE

Three physical therapists (PTs) each with at least 6 years of experience (range of 6 to 23 years) and employed in an urban university outpatient orthopaedic clinic were involved in the data collection. All patient charts in the clinic's database were reviewed to identify patients who had been seen by these 3 physical therapists for low back pain within a previous 2-year period. A total of 473 charts were identified. The investigators examined the referral scripts and assigned the patients into 1 of 2 groups—low back pain only or low back pain plus one additional body region. The LBPO group is defined as individuals presenting for physical therapy services with symptoms originating in the lumbar region. Included in the

1741_OP.indd 167 7/1/10 10:42 AM

LBPO group were patients whose buttock or leg symptoms were attributed to the lumbar region after examination. Common prescriptions included but were not restricted to 'low back pain, evaluate and treat,' 'LBP,' 'lumbago,' 'low back pain and neck pain,' 'low back and arm pain,' and 'leg pain.' Another body region group was defined as individuals with the above LBPO criteria along with cervical spine, lower, or upper limb symptoms. The symptoms were present from another separate cause other than low back, and were not considered referred from the low back. While the focus of the intervention in the LBPO group was the lumbar region, patients in the ABR group received simultaneous care for the low back area and the additional body region.

Of the original 473 charts identified, 170 charts were excluded. Patients were excluded from the study if they had a history of spine or extremity surgery (14 patients), were lost to follow up (76 patients), or due to incomplete data (80 patients) (Figure 1). No charts were found to have more than one additional region involved. After exclusions, 218 patients were included in the LBPO group and 85 were included in the ABR group.

To compare the impact of the secondary diagnoses, a third group of patients were identified and termed the clinical comparison diagnosis group (CCD). The CCD group included patients treated with cervical, upper, and lower extremity diagnoses within the same 2-year time period by the same 3 therapists. Of 338 charts identified, 142 were excluded due to surgery (68 patients), lost to follow up (51 patients), and incomplete data (23) (Figure 2). The CCD group consisted of a cervical subgroup (78 patients), upper extremity subgroup (50 patients), and lower extremity subgroup (87 patients) (Figure 2). The CCD cervical subgroup (Table 4) included patients presenting with prescriptions noting 'neck pain,' 'cervical radiculopathy,' 'neck strain and sprain,' 'cervical DJD,' 'cervical DDD,' 'herniated disc,' 'neck pain, evaluate and treat.' The CCD upper extremity subgroup (Table 5) included diagnoses such as 'Rotator Cuff Tear,' 'Arm Pain,' 'Lateral Epicondylitis,' 'Stiff Shoulder,' and 'Adhesive Capsulitis.' The CCD lower extremity subgroup (Table 6) included patients with prescriptions including but not limited to 'hip pain,' 'IT Band Syndrome,' 'knee pain,' 'Patellar Femoral Syndrome,' 'ankle pain,' 'twisted ankle,' and 'sprained ankle.'

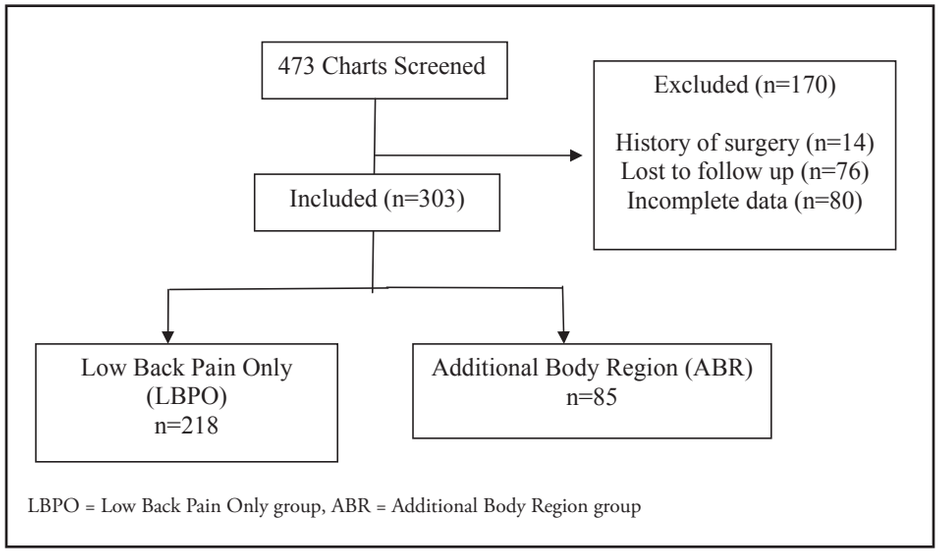

Figure 1. Summary process representing the identification of eligible charts for the LBPO and ABR groups.

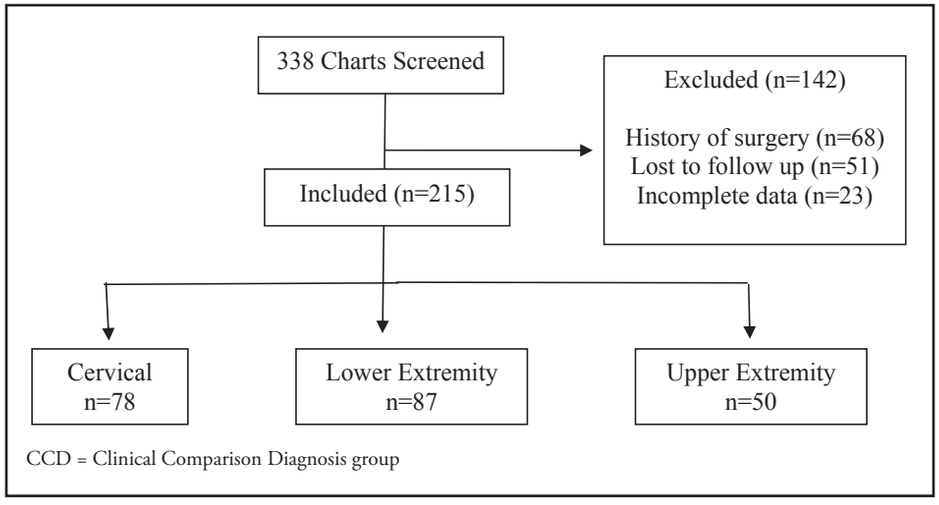

Figure 2. Summary process representing the identification of eligible charts for the CCD subgroups.

MEASURES

Outcome measures used to compare effectiveness of the treatment between the LBPO and ABR groups included the Numeric Pain Rating scale (NPR) and Oswestry Disability Index (ODI). The NPR and OSW were selected as they are established as effective outcome tools in the low back population.[19-23] The NPR is a verbal reporting scale with the patient rating his level from 0 no pain to 10 maximal pain.[22,23] The minimal clinical important difference (MCID) for the NPR is considered to be a change of two or greater.[22,23]

The ODI is a self-reporting scale with 10 questions noting the impact of low back pain on activities of daily living, each with 1 of 6 possible answers provided. The patient selects one answer per question, with the descending answers representing a value of 0 to 10. The responses are then added together to give a total score of 0 (no limitation) to 100 (severe limitations).[19-21] A decrease in both of the above scores towards 0 is the desired goal. The MCID has been identified by different authors as 12, 10, or 15.[4,11,24] For the purpose of this study, we chose to use the most conservative reported MCID of 15.

The ABR group and the CCD subgroups used 3 outcome measures including the Neck Disability Index (NDI) for patients in the cervical groups, the Penn Shoulder Score (PSS) for patients in the upper extremity groups, and the Lower Extremity Functional Scale (LEFS) for patients in the lower extremity groups.

1741_OP.indd 168 7/1/10 10:42 AM

Table 1. Characteristics of the Patients in the LBO and ABR Groups

	Low Back Pain Only (LBPO) N=218	Low Back Pain and Additional Body Region (ABR) N=85	*p* value
Sample size	218	85	Not applicable
Mean age, (y), (SD)	48.7 (15.4)	50.4 (15.6)	NS
Gender (percentage)	135 female (62%) 83 male	57 female (67%) 28 male	
Baseline OSW, (SD)	46.0 (16.9)	50.1 (17.5)	.06
Baseline NPR	7.1 (2.5)	8.1 (2.0)	< .001
Total visits	6.8 (4.0)	10.4 (6.3)	< .001

LBPO = Low Back Pain Only group, ABR = Additional Body Region group, ODI = Oswestry Disability Index, NPR = Numeric Pain Rating, NS = Not significant

Table 2. Comparison of Discharge Outcomes between the LBO and ABR Groups

	Low Back Pain Only (LBPO) N=218	Low Back Pain and Additional Body Region (ABR) N=85	*p* value
Discharge ODI, (SD)	25.2 (17.6)	42.8 (19.6)	<.001
Discharge NPR, (SD)	2.0 (2.2)	4.9 (2.9)	<.001

LBPO = Low Back Pain Only group, ABR = Additional Body Region group, ODI = Oswestry Disability Index, NPR = Numeric Pain Rating

Table 3. Successful Pain and Function Outcomes for the LBPO and ABR Groups

	LBPO Pain (N=218)	ABR Pain (N=85)	LBPO Function (N=218)	ABR Function (N=85)
Successful Events	183	48	130	16
Percentage with Successful Event (%)	84%	56%	60%	19%

LBPO = Low Back Pain Only group, ABR = Additional Body Region group
Pain was assessed using the Numeric Pain Rating (NPR) scale and success was defined as decrease in pain by 2 or more points. Function was assessed using the Oswestry Disability Index (ODI) and success was defined as a decrease of 15 or more points.

The NDI is a self-report scale requiring 1 of 6 responses to 10 questions.[25,26] The responses are graded similar to the ODI from 0 to 10, with the total score equal to the sum of the 10 questions. A score of 0, reflecting no limitations, is the most desired total score. The MCID for this outcome tool is an 8.4.[26]

The Penn Shoulder Score is a self-report questionnaire consisting of 3 subscales measuring pain, satisfaction, and function.[27,28] The total score of the 3 sections can range from 0 representing severe limitations to 100 reflecting no pain/limitations. The MCID is 12.1.[28]

The outcome measure used in the lower extremity subgroups was the LEFS.[29,30] This tool is a 10 question scale with the subject choosing from 1 of 4 responses, ranging from 0 or 'extreme difficulty/unable to perform' to 4 meaning 'no difficulty.' A total score is computed by the summation of all 20 questions, with 80 reflecting the highest function. The MCID for the LEFS is 9.30 Outcome measures for all groups were administered every 2 weeks with the initial and discharge outcomes used for analysis purposes.

TREATMENT

The 3 treating therapists applied the principles of care to the LBPO and ABR groups in accordance with the theories and classifications proposed by Fritz et al.[14] Each therapist chose the method of care independently based upon the results of the initial examination and subsequent response of care without influence or bias from the other two therapists. If the patient presented with symptoms that centralized with extension or flexion movement, then that was the exercise treatment bias applied. If the patient presented with an instability catch, positive prone instability test, hypomobility of a segment(s), then stabilization techniques were used. When the patient exhibited hypomobility, recent onset of symptoms, no complaints below the knee, and increased hip internal rotation greater than 35°, mobilization was applied. If patient complaints appeared to be nerve root compression and did not respond to any of the above techniques, then traction was used. Each plan of care was progressed as per tolerance.[19-21]

The cervical patients in the ABR and CCD groups were treated using the guidelines as suggested by Childs et al.[31] These guidelines divide cervical patients into 1 of 5 groups including a mobilization group, a group who respond to centralization with repeated movements, a headache reduction group, a conditioning and exercise group, and a pain control group. Mobilization patients had recent onset of symptoms (less than 12 weeks), no radicular complaints, and no signs of nerve root compression. These patients were treated with cervical/thoracic mobilization and active range of motion exercises. Centralizers had referred complaints into the upper quarter, signs of nerve root compression, pathoanatomic cervical radiculopathy, and centralization of complaints with repeated movements. Treatment consisted of mechanical or manual distraction and repeated movement biased exercises. Conditioning and exercise group patients typically presented with lower pain and outcome measures, no response to repeated movement testing, longer duration of symptoms (greater than 12 weeks), and no sign of root compression. Care consisted of strengthening, conditioning, and endurance exercises for the cervical and upper quarter. Pain control subjects included those with recent onset of symptoms (within several weeks), high pain and outcome scores, complaints precipitated by trauma, referred symptoms into the upper extremity, and poor tolerance to examination and subsequent interventions. Treatment included use of modalities for pain control, gentle active range of motion exercises, and activity modification. The headache reduction group included patient with unilateral headache proceeded by cervical pain, and headaches produced by movement/direct pressure on the posterior cervical region. Treatment consisted of cervical mobilization, exercises for the cervical and upper extremities, and postural education.[31]

1741_OP.indd 169 7/1/10 10:42 AM

Table 4. Comparison of the ABR and CCD Cervical Subgroups

	Clinical Comparison Diagnosis (CCD) N=78	Low Back Pain and Additional Body Region (ABR) N=43
Mean age, (y), (SD)	48.0 (14.5)	44.9 (15.7)
Gender (percentage)	61 female (78%) 17 male	28 female (65%) 15 male
Baseline NDI, (SD)	36.8 (8.5)	47.0 (16.4)
Discharge NDI, (SD)	20.6 (11.4)	38.1 (14.5)
Successful events	62	24
Percentage with successful events (%)	79%	56%
Baseline NPR, (SD)	7.1 (1.4)	8.1 (1.8)
Discharge NPR, (SD)	2.3 (0.7)	5.2 (2.2)
Successful events	72	36
Percentage with successful events (%)	92%	84%

CCD = Clinical Comparison Diagnosis group,
ABR = Additional Body Region group,
NDI = Neck Disability Index, NPR = Numeric Pain Rating

Table 5. Comparison of the ABR and CCD Upper Extremity Subgroups

	Clinical Comparison Diagnosis Group (CCD) N=50	Low Back Pain and Additional Body Region (ABR) N=16
Mean age, (y), (SD)	52.8 (18.2)	51.8 (17.2)
Gender (percentage)	33 female (66%) 17 male	11 female (69%) 5 male
Baseline PSS, (SD)	50.1 (36.8)	29.2 (10.2)
Discharge PSS, (SD)	73.1 (20.5)	45.2 (18.9)
Successful events	44	12
Percentage with successful events (%)	88%	75%
Baseline NPR, (SD)	6.9 (0.7)	8.3 (1.6)
Discharge NPR, (SD)	2.5 (0.7)	5.2 (2.7)
Successful events	44	14
Percentage with successful events (%)	88%	87%

CCD = Clinical Comparison Diagnosis group,
ABR = Additional Body Region group,
PSS = Penn Shoulder Score, NPR = Numeric Pain Rating

Table 6. Comparison of the ABR and CCD Lower Extremity Subgroups

	Clinical Comparison Diagnosis Group (CCD) N=87	Low Back Pain and Additional Body Region (ABR) N=26
Mean age, (y), (SD)	49.7 (15.7)	56.4 (11.7)
Gender (percentage)	70 female (80%) 17 male	20 female (77%) 6 male
Baseline LEFS, (SD)	40.2 (26.2)	28.8 (11.5)
Discharge LEFS, (SD)	54.1 (36.8)	41.0 (13.2)
Successful events	62	15
Percentage with successful events (%)	71%	58%
Baseline NPR, (SD)	5.9 (2.1)	8.2 (1.5)
Discharge NPR, (SD)	2.5 (3.5)	4.9 (1.2)
Successful events	62	24
Percentage with successful events (%)	72%	92%

CCD = Clinical Comparison Diagnosis group,
ABR = Additional Body Region group,
LEFS = Lower Extremity Functional Score, NPR = Numeric Pain Rating

The ABR and CCD upper extremity and lower extremity groups were evaluated and treated based on the biomechanical deficits found. Generalized weakness, joint stiffness, impingement, compression, and instability are examples of this. Care was directed towards that particular deficit and included strengthening exercises for weakness, mobilization for joint stiffness, decompression for impingement/compression, and stabilization exercises for instability. Each of the three therapists provided evaluation, treatment, and progression independently.

DATA ANALYSIS

Descriptive statistics were used to assess the mean, standard deviations, and range of all demographic and outcome variables. Student's t tests were used to assess for differences at baseline in all outcome scores. The data was analyzed by using Analysis of Covariance (ANCOVA) to assess for differences between the group scores, with the pretest scores used as a covariate. The differences were considered significant if the p value was $< .05$.

RESULTS

Both the LBPO and ABR groups demonstrated a decrease in pain scores from baseline to discharge, with the LBPO group decreasing from 7.1 ± 2.5 to 2.0 ± 2.2 and the ABR group decreasing from 8.1 ± 2.0 to 4.9 ± 2.9. With the differences in baseline scores controlled, there was a significant difference found between pain discharge scores for the LBPO and ABR groups ($F=82.9$, $p < .001$). The ODI scores were also significantly different between groups with the LBPO decreasing from 46.0 ± 16.9 to 25.2 ± 17.6 while the ABR group decreased from 50.1± 17.5 to 42.8. ± 19.6. Significant differences were found between the LBPO and ABR groups for discharge OSW scores ($F=57.1$, $p < .000$). The number of visits between the two groups were significantly different, this being 6.8 ± 4.0 for the LBO group, while the ABR group was 10.4 ± 15.6 ($F= 36.4$, $p < .001$) (Tables 1 and 2).

The change in outcome scores was also examined for clinical success at discharge. The MCID is defined as the "amount of change that best distinguishes between patients who have improved and those that remain stable."21 For this study, clinical success was defined as a change in the baseline score of at least the value of the MCID

1741_OP.indd 170 7/1/10 10:42 AM

for that particular measure. For both the LBPO and ABR groups, successful and unsuccessful outcomes were calculated for the OSW and the NPR. A successful event for the OSW was a decrease by 15 or greater points and a successful event for the NPR was a decrease by at least 2 points. Eight-four percent of the LBPO group experienced a successful event for the pain outcome as compared to only 56% of the ABR group. Sixty percent of the LBPO group experienced a successful event for the OSW measure, with only 19% of the ABR group (Table 3).

Secondary analysis compared the CCD and the ABR groups, which consisted of 3 subgroups--a cervical, an upper extremity, and a lower extremity subgroup. The cervical subgroup of the CCD sample demonstrated a decrease in the NDI from 38.8 ± 8.5 to 20.6 ± 1.4 as compared to the ABR cervical subgroup, that only demonstrated a decrease from 47.0 ± 16.4 to 38.1 ± 14.5. A successful event was defined as a decrease in the NDI by at least 8.4 points. The CCD group had a 79% success rate as compared to 56% in the ABR group. Pain decreased from 7.1 ± 1.4 to 2.3 ± 0.7 at discharge in the CCD cervical subgroup as compared to 8.1 ± 1.8 to 5.2 ± 2.2 in the ABR group. Ninety two percent of the CCD cervical subgroup had a 2 or more point decrease in pain as compared to 84% of the ABR group (Table 4).

The upper extremity subgroup of the CCD sample demonstrated an increase in the PSS from 50.1 ± 36.8 to 73.1 ± 20.5 as compared to the ABR upper extremity subgroup, that demonstrated an increase from 29.2 ± 10.2 to 45.2 ± 18.9. A successful event was defined as an increase in the PSS by at least 12.1 points. The CCD group had an 88% success rate as compared to 75% in the ABR group. Pain decreased from 6.9 ± 0.7 to 2.5 ± 0.7 at discharge in the CCD upper extremity subgroup as compared to 8.3 ±1.6 to 5.2 ± 2.7 in the ABR group. Eighty-eight percent of the CCD upper extremity subgroup had a 2 or more point decrease in pain as compared to 87% of the ABR group (Table 5).

The lower extremity subgroup of the CCD sample demonstrated an increase in the LEFS from 40.2 ± 26.2 to 54.1 ± 36.8 as compared to the ABR lower extremity subgroup, that demonstrated an increase from 28.8 ± 11.5 to 41.0 ± 13.2. A successful event was defined as an increase in the LEFS by at least 9 points. The CCD group had a 71% success rate as compared to 58% in the ABR group. Pain decreased from 5.9 ± 2.1 to 2.5 ± 3.5 at discharge in the CCD lower extremity subgroup as compared to 8.2 ± 1.5 to 4.9 ± 1.2 in the ABR group. Seventy-two percent of the CCD lower extremity subgroup had a 2 or more point decrease in pain as compared to 92% of the ABR group (Table 6).

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DISCUSSION

Our retrospective study provides some preliminary data suggesting the existence of discharge differences between patients receiving physical therapy for one body region (LBPO) as compared to a group presenting with low back pain and another affected body region. After controlling for baseline differences, the ABR group was unable to achieve as great of an improvement in function with the mean change in ODI only 7.4 compared to 20.8 of the LBPO group. This lack of improvement in outcome in the ABR group occurred despite an average of 10.4 ± 6.3 visits compared to only 6.8 (4.0) in the LBPO group (Table 1). Likewise, the LBPO group demonstrated a significant improvement in pain outcomes as compared to the ABR group, decreasing to 2.0 (2.2) as compared to 4.9 (2.7) of the ABR group (Table 2). The lower pain scores occurred despite an extra 4 visits on average received by the ABR group (Table 1).

Both groups were also compared based on successful outcomes, with success defined as an improvement in the outcome measure at least the value of the MCID for the particular measure. Despite a greater number of visits, the ABR group yielded less success with pain reduction, with only 19% of the ABR cases considered successful, compared to 56% in the LBPO group. The LBPO group also exhibited higher percentages of successful outcomes with the ODI having 84% compared to the 56% of the ABR group (Table 3).

The findings between the LBPO and ABR groups were corroborated by comparing the ABR group to the CCD from the 3 therapists. All 3 subgroups of the CCD group demonstrated better discharge outcomes and a greater decrease in pain in less visits (Tables 4, 5, 6). Despite significant differences between the discharge outcomes between all 3 subgroups, the percentage of success was very similar between subgroups, the ABR lower extremity subgroup demonstrating greater success over the CCD lower extremity subgroup, 92% versus 72% respectfully. We theorize that because the ABR lower extremity subgroup contained only 26 patients, there was a wider range of scores in the sample data (Table 6).

The higher success in the LBPO and CCD groups can be attributed to a number of factors. In both the LBPO and CCD groups, the therapist was able to focus the intervention on one body region in a specific time allotment, as compared to intervening on 2 areas in the same amount of time. As with most clinics, our clinic does not adjust the amount of time for the examination and intervention for patient complexity. This can account for a delay in the completion of the examination, prolonging the initiation of the plan of care. Time limitations could also impact the ABR group with increased time required to review symptoms and home exercise programs and for completion of the outcome forms. A patient in the ABR group would be instructed in 2 different home exercise programs, which require additional time to complete, potentially affecting patient compliance. Although we did not document home exercise compliance in this study, research has documented poor compliance in patients with one diagnosis. This noncompliance may be compounded with greater involvement of body regions.[32,33]

A second limitation of this study is reflective of study design. Because our study was retrospective, the interventions rendered by each therapist used similar guidelines, but was not standardized. The lack of standardization could have underestimated our discharge pain and functional outcomes. Likewise, there were many potential confounding variables that were not controlled such as mechanism of injury, secondary gain, acuity and type of injury, race and ethnicity, work status, and use of

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medications that may have influenced the results. Despite the stated limitations, the results of this study provide valuable baseline information for therapists working in an outpatient setting.

Further research in this area would provide additional information on best treatment options for these 2 groups of patients. A randomized trial would offer further data on discharge outcome differences after receiving varying treatment focuses in the ABR population. Also, studying the effect of further treatment sessions in the ABR group may allow improvements in discharge outcomes by reducing the time limitation in treating multiple body regions. Examining whether the prioritization of treatment would be more effective in achieving better outcomes would provide valuable information in this area.

Despite these limitations, the information gained from this study is an important first step in documenting the issue of treating multiple regions that many therapists face on a daily basis.

CONCLUSION

Patients seek treatment at outpatient physical therapy clinics with multiple body regions affected. This study documents differences exist in discharge pain and functional outcomes between patients with low back pain only and those with both low back pain and another affected body region. The results of this study can be used to adjust goal setting, estimate the amount of change in both populations (LBPO and ABR) and prioritize treatment options to achieve desired outcomes for the patients presenting with low back pain and an additional body region.

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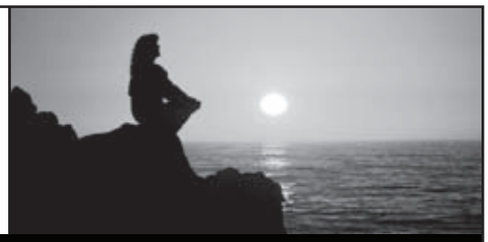

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1741_OP.indd 173 7/1/10 10:42 AM

Book Review

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

Perry J, Burnfield J. Gait Analysis: *Normal and Pathological Function*. 2nd ed. Thorofare, NJ: Slack, Inc.; 2010, 551 pp., illus.

This edition of the book follows the original publication of 18 years ago. The first section of the book has 3 chapters detailing the fundamentals of gait. The gait cycle, phases of gait, and the basic functions of gait are described in order to lay the foundation for later chapters on normal and pathological gait.

The second section of the book discusses normal gait, with a designated chapter for each of the following areas: ankle-foot complex, knee, hip, head/trunk/pelvis, and arm. The format for each of the chapters is very similar, with gait dynamics and functional interpretations for each joint covered. The motion, function, and percentage of the gait cycle are described. There are detailed descriptions of what occurs at each phase of the gait cycle for each joint, allowing the reader to understand thoroughly the mechanics of gait. Illustrations and photographs reinforce the descriptions. The last chapter in this section describes total limb function and bilateral synergistic relationships. It provides an integration of material from the previous chapters where, instead of looking at individual joints at points in the gait cycle, it discusses how the limbs move throughout the entire cycle.

The third section of the book covers pathological gait in 5 chapters. The first chapter describes the effects of pathological mechanisms on gait, including deformity, muscle weakness, sensory loss, pain, and impaired motor control. Causes and compensations for each of the abnormalities are covered. Additionally, how the gait is affected with an individual loss or a combination of more than one abnormality is also discussed. The remaining 4 chapters in this section focus on deviations of the ankle and foot, knee, hip, and trunk and pelvis. These deviations are divided into groups based on plane of motion: sagittal, coronal, or transverse. All sections describe the deviation, the phase of the gait cycle it occurs in, the functional significance, underlying cause, and the biomechanics that occur during that phase of the gait cycle. There is one error in chapter 14, in a subheading within the section on trunk deviations that may initially confuse the reader. It erroneously has a subheading of coronal plane pelvic deviations instead of stating coronal plane trunk deviations. However, the topics covered within this section are correctly placed, as they cover the trunk deviations of ipsilateral and contralateral trunk lean.

The fourth section of the book covers clinical considerations. The first chapter lists and describes examples of pathological gait. Types of deformities, muscle weakness, pain, and impaired motor control are discussed with their impact on gait. The second chapter, a new topic in this edition, covers pediatric gait analysis. This is a great addition to the book since young children do not display the same gait patterns as adults. The chapter discusses how a child's gait starts when they first start to walk and how it progresses to an adult-like pattern as the child ages. Also included are the topics of cerebral palsy and myelomeningocele with their gait problems, as well as uses of gait labs for children.

Section 5 of the book includes 2 chapters that are also new to this edition. The first is on the negotiation of stairs. The motion, muscle control, forces, power, and functional significance for ascending and descending stairs are detailed in a similar fashion to previous chapters of individual joints on normal gait. The next chapter is on running. The terminology and timing of running is covered first since the periods of running differ from that of walking. The motion and muscle control for the stance and swing phases are then covered, followed by clinical implications of running. Both of these chapters are also welcome additions to the book since the mechanics of both stair negotiation and running are very different than that of walking. These 2 chapters provide further insight into how the body moves across different surfaces and at various speeds.

The final section of the book covers quantified gait analysis. It includes 6 chapters, with the first of them giving a brief introduction. The chapter on motion analysis lists the various ways that gait can be analyzed. The next chapter describes muscle control and quantification with electromyography (EMG). It starts with a review of the anatomy of muscle followed by the details of EMG, its interpretation, analysis with pathological gait, and instrumentation. A chapter on the kinetics of gait follows, covering ground reaction forces, vectors, moments, power, and pressure. Following this is a chapter on stride analysis, detailing stride measuring systems and variability contributing to different strides. The final chapter in this section is on energy expenditure. It covers a variety of material including energy metabolism, maximum aerobic capacity, resting and standing metabolism, energy expenditure at normal and fast walking, and how energy expenditure is altered with various pathologies.

The authors' intent at updating the book was well done. At the very beginning of the book, in the introduction section, they detail how they came to updating their book, including material they clarified further, changed, and added. The updating of references and overall content was very well done. The addition of the new chapters is a great compliment to the material provided. Another helpful addition to the book is the appendix on normative sagittal plane joint motion for the ankle, knee, thigh, and hip at all parts of the gait cycle. The format of this edition is also better organized so it is easier to follow and look for material. All chapters are well referenced. There are ample pictures, diagrams, graphs, and tables to assist the reader in visualizing the material presented, and to emphasize important points throughout each chapter. Overall, this book succeeded in updating information on all aspects of gait and continues to be a comprehensive reference on the topic. I would recommend this book for therapists of all levels of experience, as it is easy to follow and has a multitude of didactic and clinical information relating to gait.

Michelle Finnegan, DPT, OCS, MTC, FAAOMPT

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BRINGING THE SECTION'S ELECTION CYCLE INTO COMPLIANCE WITH THE SECTION'S MOST RECENT BYLAW AMENDMENT

By Jennifer M. Gamboa, DPT, OCS, MTC, Nominating Committee Chair

At the 2007 Orthopaedic Section Fall Board of Directors Meeting, because of potential issues that could arise with the President and Vice President being elected in the same year, the Board discussed the possibility of creating a President Elect position. After much discussion the decision was made not to create this new position but instead have the Board initiate a bylaw change to stagger the election of the President and Vice President. This Section bylaw amendment was approved by the membership in 2008 and the staggered terms for President and Vice President went into effect in 2009. As a result of this amendment, the Section Bylaws currently state:

SECTION 2: ELECTION CYCLE

The members of the Board of Directors shall be elected as follows:

A. The President and Vice President shall be elected on a staggered basis with the Vice President being elected the year following the election of the President. The respective elections shall take place every three years.

B. In the next year the Treasurer and Non-officer Director #1 shall be elected.

C. In the next year Non-officer Director #2 shall be elected.

Proviso: At the conclusion of the current Presidential election cycle following the adoption of the staggered terms amendment (above), the Vice President's term will be extended for an additional one year term. At the conclusion of this additional one year term, a Vice President will be elected for a three year term as above. Any term limitations will not apply to the extended additional one year term of the Vice President in establishing the staggered election cycle.

As a result of this amendment change, the Section's election cycle for Treasurer and Director's 1 and 2 were also affected. At CSM 2010 the Board wanted further clarification of the election cycle and sought the advice of John Stackpole, APTA Parliamentarian. Based on Dr. Stackpole's interpretation of the current Section Bylaws, he recommended the following re-alignment of the Section's election cycle to bring the election cycle into compliance with the current bylaws.

President and Director 2 –assume offices in year one (2010)
Vice President –assume office in year two (2011)
Treasurer and Director 1 –assume office in year three (2012)

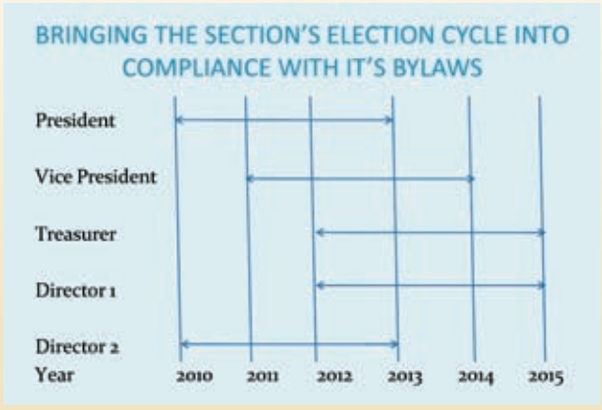
In order to accomplish the election cycle re-alignment, the current Vice President's term needed to be extended by 1 year (until CSM 2011), the current Treasurer's term extended by 1 year (until CSM 2012) and the current Director 1's term extended by 2 years (until CSM 2013). This was agreed to by the Board of Directors and is supported in the Section Bylaws as follows:

ARTICLE VII, SECTION 1.D. TERMS

The terms of the Principal Officers and the Non-officer Directors shall be three years or until the election and assumption to office of their successors, in accordance with Article XI, Elections.

Since Director 2 was not actually elected for the term that began in 2010, it was considered an "implicit election." This is allowable due to the "or until" clause under Article VII, Section 1.D. from the Section Bylaws inserted above. This means that the incumbent stays in office, in effect extending his second term, until such time as the next election for this position (2013). Director 2, William O'Grady, has agreed to continue in his position until the next election for Director 2 is held in November 2012. Both the Vice President and Treasurer have agreed to extend their terms by 1 year. With these modifications and changes in term limits, the Section's election cycle will be brought into compliance with the current Section bylaws

Below is the election cycle diagram developed by Mr. Stackpole to describe the correct election cycle.



CALL FOR CANDIDATES

Dear Orthopaedic Section Members:

The Orthopaedic Section wants you to know of two positions available for service within the Section opening up in February, 2010. If you wish to nominate yourself or someone else, please contact the Nominating Committee Chair, Jennifer Gamboa, at jgamboa@bodydynamicsinc.com.

Deadline for nominations: September 7, 2010. Elections will be conducted during the month of November.

Open Section Offices:

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

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

1741_OP.indd 176 7/1/10 10:42 AM

OCCUPATIONAL HEALTH

SPECIAL INTEREST GROUP

PRESIDENT'S MESSAGE

HAPPY SUMMER TO ALL!

The OHSIG continues work on behalf of our members. Here are a few important updates for you.

PAYMENT POLICY LIAISONS REQUESTED

A letter was sent to State Chapter Presidents and Executive Directors asking that a liaison be identified to work with the OHSIG Practice and Payment Policy Committee. Rick Wickstrom, Committee Chair stated that having liaisons "will help us share relevant information with physical therapists, payers, regulators and other occupational health professionals as a public relations strategy to promote professionalism of physical therapists. We hope that creating state-specific payment policy liaisons for the Occupational Health Special Interest Group will encourage greater networking on matters that impact practice and reimbursement for our specialty, thus reinforcing the benefits of belonging to APTA and the Orthopaedic Section's Occupational Health Special Interest Group."

OHSIG and the Practice and Payment Policy Committee are working with Karen Jost, Associate Director Payment Policy & Advocacy, APTA, on a Workers' Compensation Audio conference. The audio conference is scheduled for Aug 19th. Watch for more details on this.

If you are interested in more information on becoming a liaison, contact Rick Wickstrom at rick@workability.us.

MAY MEMBER EMAIL BLAST

Our thanks to Sandy Goldstein, OHSIG Communication Chair, for coordinating the Email Blast to OHSIG members in May. If you did not receive the email blast, contact Sandy at sanfordgoldstein@hotmail.com.

PETITION FOR SPECIALIZATION IN OCCUPATIONAL HEALTH PT

The petition is nearly completed. Dee Daley leads the efforts along with the entire BOD. We are working on sample test questions. We will keep you posted on the submission and progress of the petition.

DEFENSIBLE DOCUMENTATION

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

GUIDELINES UPDATE

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

APTA RELEASES NEW GUIDELINES: EVALUATING FUNCTIONAL CAPACITY

The following was released by APTA. We are very proud of the work that went into this endeavor!

The American Physical Therapy Association released a major update of guidelines for Functional Capacity Evaluation (FCE) services by physical therapy professionals. An FCE is a detailed examination and evaluation that objectively measures an evaluee's current level of function, primarily within the context of the demands of competitive employment, activities of daily living, or leisure activities. Measurements of function from an FCE are used to make return-to-work/activity decisions, disability determinations, or to design rehabilitation plans. This supports tertiary prevention by preventing needless disability or activity restrictions.

The FCE Guidelines update was initiated by the APTA Occupational Health Special Interest Group by convening a task force of physical therapy professionals at the 2008 APTA Combined Sections Meeting. Task force members had FCE expertise that included most of the recognized FCE systems in the United States and Canada. Their challenge was to promote greater excellence, accountability, and consistency of functional capacity evaluations. A summary of key revisions includes:

- Integrating FCE guidelines within the context of language and framework of The International Classification of Functioning, Disability, and Health.
- Distinguishing critical components and location requirements for 2 different types of functional capacity evaluations--General Purpose vs. Job-Specific.
- Incorporating definitions of conditions and ratings to match worker functional capacities and job demands in a worker job-match taxonomy.
- Clarifying admission criteria for functional capacity testing in early intervention versus chronic applications.
- Adopting a clear position against inappropriate delegation of FCE activities to support staff that cannot perform PT examination/evaluation procedures within their scope of work.
- Establishing duration guidance for appropriate use of professional time.

DELPHI STUDY ON FUNCTIONAL CAPACITY

Members of the FCE Task Force were asked to become part of a Delphi Study on functional capacity. Members of the Netherland's study group include: Michiel F Reneman, PhD; Harriet Wittink, PhD; Cees P van der Schans, PhD; Jan HB Geertzen, PhD.

Please watch for updates on this important study.

1741_OP.indd 177 7/1/10 10:42 AM

OCCUPATIONAL INFORMATIONAL DEVELOPMENT ADVISORY PANEL (OIDAP)

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

OHSIG, APTA, and ACOEM - Collaboration ACOEM Practice Guidelines

OHSIG will have the opportunity to review the ACOEM Practice Guideline chapters as a part of ACOEM's comprehensive review of their clinical practice guidelines. OHSIG will participate in reviewing the following Foundation Chapters:

- Prevention
- General Approach to Initial Assessment and Documentation
- Initial Approaches to Treatment
- Work-Relatedness
- Cornerstones of Disability Prevention and Management
- Independent Medical Examinations

OHSIG involvement in initiatives such as this through ACOEM and APTA are important to assure best clinical practice guidelines are in place. Our input can make a difference! Sandy Goldstein, OHSIG Communication Chair, is reviewing the IME chapter. Other reviewers to be named as chapters become due.

NEED AUTHORS

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

MEMBER INVOLVEMENT

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

Professional Regards,
Margot Miller PT
OHSIG President

WHAT WORKS IN WORKERS' COMPENSATION

By Nicole Matoushek, PT, MPH

Nicole has over 17 years in physical therapy and workers' compensation industry. She currently is VP at Align Networks. She can be reached at www.AlignNetworks.com.

The workers' compensation marketplace is a whirlwind of fee schedules, visit caps, ergonomic risk factors, confounding influencing factors, and clinical complications. So how does a therapy provider rise to the challenge and generate successful outcomes? After nearly 2 decades of exposure to the workers' compensation arena with experience in physical therapy treatment, ergonomics, return to work programs, and managed care companies, I have found the following factors the key to success in workers' compensation.

ACTIVE CLINICAL MANAGEMENT

What works best in workers' compensation is active clinical management to optimize outcomes and reduce work-related impairment. Effectively managing therapy care in the workers' compensation arena requires that the therapist apply clinical management strategies focused on the delivery of medically necessary care. Various reimbursement programs may encourage either under- or over-utilization of therapy services. It is critical that the therapist focus on providing medically necessary care appropriate for that individual patient. For example, not all lumbar strain patients will require the same treatment; therefore, the therapist should continually apply active clinical management to modify treatment interventions, treatment goals, visit frequency, and duration and length of care per the needs of that patient. Additionally, the therapist should focus on functional tasks, activities that incorporate strength, endurance, and practical skills as opposed to a focus on passive modalities or other treatments. Patient responsibility to attend therapy sessions and comply with a home based exercise program is also important. Equally as important, attempts to schedule the patient before or after work will allow the patient to continue to perform her productive duties at work without missing excessive time due to therapy. If the patient appears to require more or less treatment than the prescription or medical orders, the best clinical outcomes result when the therapist takes the initiative to contact the treating physician and recommend a more appropriate plan of care.

BEST PRACTICE/CLINICAL GUIDELINES

The term best practice guideline describes the use of clinical pathways and guidelines to manage care and disability. In theory, if a therapist follows the established best practice guidelines, the therapy outcomes should reflect the outcome established in researched guidelines. As an example, if the best practice guideline for therapy care regarding the visits for a lumbar strain is 10 visits, a therapist following best practice pathways for a lumbar strain patient should not exceed 10 visits. Best practice guidelines are recognized and an acceptable means to assist claims management. What works in workers' compensation is applying best practices in therapy care to the overall treatment and management of the workers' compensation patient. Best practices and optimized outcomes are a result of a culmination of proper documentation of clinical findings and progress, outcomes driven care, and the application of clinical visit guidelines.

When treating workers' compensation patients in the clinic or onsite, it is very important to address physical impairments and relate them to work limitations or abilities. The majority of the time, the primary goal in worker rehabilitation is to return the worker back to productive meaningful work, whether it be the same job or a new job. By improving documentation and communication related to the individual's work abilities, the therapist can assist the stay at work/return-to-work process. The therapist should add details about how injury occurred, include information on the essential job demands and what the injured worker can/cannot do at work during the initial evaluation session. Furthermore the clinician should develop treatment plans and therapy goals that include functional and work-specific goals and direct goals toward restoring

1741_OP.indd 178 7/1/10 10:42 AM

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safe performance of job-related functions. If the therapist does not know the essential job demands, they can often learn more about what the worker does through the employer, case manager, adjuster, or by simply asking the patient what he/she does at work and what they would have problems doing at work in because of the injury. The best option may be for the therapist to visit the worksite to review the job, see how it's performed, and take actual measurements if the forces/distances/weights are not known.

Regular progress notes should document observed or tested neuromuscular improvements or changes in addition to progress and noted limitations in functional activities. At the time of discharge, the therapist once again has an opportunity to make a positive impact on the patient's return to work by offering the case manager, adjuster, employer, and referring physician insight as to how ready the patient is to return to work, either full or modified duty. The therapist should document observed or tested functional abilities or limitations with functional activities and any work-specific activities that have been addressed in therapy. Therapists who include patient progress in terms of improved function really stand out against their competition.

Additional information that is helpful for professionals who are managing the claim include estimated or projected continued therapy care in weeks, visit count, include information such as no show/cancellations and any confounding factors that may be influencing care. Confounding factors may be clinical factors or external factors. Both can adversely affect therapy outcomes, costs, and return-to-work objectives. Clinical outliers are patients who, based on additional medical or clinical factors, are likely to require more therapy than would be recommended by normative data or guidelines Clinical factors, such as co-morbidity or a physiological response to the injury that is considered excessive, such as uncontrolled inflammation or excessive scarring that may delay healing, can qualify a patient as a clinical outlier.. When a clinical outlier is identified, documentation should include your objective clinical findings and clinical rationale to support the need for continued care beyond the recommended guidelines.

External factors can also adversely affect therapy and they need to be reported with appropriate documentation. Such factors could include the patient's ability/inability to attend therapy sessions due to work schedules or other reasons for missing therapy. Work factors may affect the patient's ability to heal or a confounding factor may be the influence of an attorney. In all cases, documentation should be professional and succinct.

UTILIZATION

Utilization is another important consideration in workers' compensation. There are several clinical guidelines that a therapist may reference. In the workers' compensation market, the industry standards include American College of Occupational and Environmental Medicine (ACOEM), Official Disability Guidelines (ODG), American Physical Therapy Association (APTA), and Medical Disability Advisor (MDA). Additionally, a payor group or network may have their own proprietary system of clinical guidelines. Often these proprietary guidelines incorporate data from ACOEM, ODG, or MDA and their own claims data and experience. All of these clinical guidelines can be extremely useful in managing therapy visit utilization, durations of care, and treatment goals.

WORK-SPECIFIC GOALS AND TREATMENTS

As stated and recommended by the APTA, the overall objective of worker rehabilitation is to facilitate healing and minimize work-related impairment. What is needed in the workers' compensation arena is for the therapist to continually be aware that the primary goal is safe and appropriate stay at work or return to work for their patient. The best way to ensure this is accomplished efficiently is to incorporate work-specific goals and treatments into therapy interventions. Actual work tasks or simulated tasks in a controlled and supervised environment are an effective way to recondition the worker to be prepared for return to work and to improve patient confidence with work abilities as well. Additionally, this allows the therapist to observe body mechanics, functional abilities, and limitations to share with the physician when he/she is making return to work plans and restrictions for their patient.

OUTCOME METRICS

The workers' compensation marketplace can be highly competitive. The provider with the best outcomes typically receives a continuous and increasing supply of referrals. Important outcomes that should be tracked and managed by therapy providers in worker rehabilitation include: visit count by episode of care, duration of therapy care, timeliness of scheduling initial evaluation, number of no-shows or cancellations, improvement in pain scores, improvement in function, and if possible, return-to-work outcomes. It is critical for the therapist to remember the ultimate goal in worker rehabilitation is a safe and timely return to work, maximizing function while minimizing occupationally related impairment. All of the outcomes listed above, when managed well, can and do make a positive impact on overall therapy care, client and patient satisfaction, safe return to work, and cost containment.

EFFECTIVE CLINICAL DOCUMENTATION

In this industry, clinical documentation is about the therapist working on behalf of the patient, the treating physician, the employer, the claims adjuster, and the case manager. After reviewing therapy notes for nearly a decade, I continue to observe vague progress notes that provide little or no value and certainly do not provide a clear picture of the

1741_OP.indd 179 7/1/10 10:42 AM

injured worker's status, function, and ability to progress, let alone what they may be able to do at work.

Additionally, payors repeatedly comment that in general, physical therapy documentation lacks a focus on functional performance in work-related goal-setting and in work-specific treatment planning. A primary goal for workers' compensation patients should be return to work and the minimization of work-related impairment. Often times this goal is omitted. What works in workers' compensation is effective clinical documentation from the start of care through termination, documentation that provides useful information regarding visit attendance, reasons for lack of attendance or progress, treatment interventions, response to treatment, work-specific goals, work-specific activities, and any observed limitations as they relate to performing personal Activities of Daily Living and/or work function. Both short-term and long-term goals should include measurable work-specific goals. For example:

> SAMPLE Short-term Goal: Patient will be able to lift 10# from floor to waist 10 times with good body mechanics within 2 weeks, preparing patient for modified duty work tasks as per job description.
>
> SAMPLE Long-term Goal: Patient will be able to lift 35# from floor to waist 20 times with good body mechanics within 4 weeks, preparing patient for full duty status as per job description.

Additionally, upon discharge or discontinuation of therapy services, the therapist should include the reason for therapy closure, did the physician discontinue therapy, did the patient become noncompliant, did the patient require surgery, etc. For effective documentation, therapists should also document any further clinical interventions that are recommended as they pertain to physical therapy, the overall response to treatment and a summary of the injured worker's functional status. Lastly, therapists should identify whether the patient appears to be an appropriate candidate for an advanced Return to Work program or FCE, and include clinical rationale.

Finally, in order to minimize reimbursement issues, make sure you are billing the correct entity. For example if you received the referral from a specialty network, do not bill the payor directly. Make sure you attach treatment notes to your bills and that your treatment notes support the bills that are submitted. Independent of what entity you are billing, become familiar with state specific workers' compensation jurisdiction laws and always bill according to their billing policies. This facilitates prompt payment and reduces bill denials.

PEER REVIEWS

Many of us find professional clinical peer reviews very useful in assessing quality of care, to assist in determining medical necessity, and in facilitating case closure. Peer reviews are valuable because they allow for different perspectives and provide critical feedback on what appears rationale and what appears problematic in physical therapy care. Peer reviews have been found to be an effective means of managing physical therapy care due to the "peer pressure" from a cohort reviewing clinical files as opposed to alternate professionals reviewing the files, where discrepancies in care are more difficult to determine. What works in workers' compensation is when a therapist has the opportunity to discuss a treatment plan with a peer therapist and you come to agreement regarding the course of care. Often a new set of eyes can provide insight and ideas for treatment modifications, clinical plateaus in progress or compliance challenges.

ADVANCED COMPETENCIES AND TRAINING

Worker rehabilitation is a specialty area of physical therapy. To generate superior outcomes and success requires advanced training, education, and the development of specific physical therapy skills and competencies. What works in workers' compensation is when therapists who provide worker rehabilitation participate in advanced training to gain needed skills and competencies. There are numerous continuing education programs available to therapists that offer training in ergonomics, functional capacity evaluations, return to work programs, pre-employment screening, etc. It is recommended that all therapists treating workers' compensation patients have a good understanding of all facets of worker rehabilitation. The APTA also has valuable educational resources available to the physical therapist working in the occupational setting.

SUMMARY

The workers' compensation industry is relying on the physical therapy industry for practical and functionally based treatments and documentation. The areas addressed in this article will make a positive impact on physical therapy care in the challenging area of workers' compensation.

THE EFFECT ON PHYSICAL THERAPY OUTCOMES...A RETROSPECTIVE STUDY

(Continued from page 172)

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1741_OP.indd 180 7/1/10 10:42 AM

PERFORMING ARTS

SPECIAL INTEREST GROUP

SUMMER GREETINGS!

I hope that everyone gets an opportunity this summer to recharge your batteries with a vacation. Sometimes a vacation at home can be very rewarding as you catch up on home projects; or, sometimes a trip abroad broadens your worldly knowledge of history and culture. Whatever you have planned, enjoy--you earned it!!

Amidst your work and vacations this summer, I ask you to take 5 minutes to update your PASIG Membership Profile. The Performing Arts Special Interest Group (PASIG) worked hard to develop a directory search that would be more useful to members. You will be able to search for a PASIG member by city, state, performing arts specialty, clinical affiliation, and more! You will be able to view demographic information on a PASIG member such as type of performing arts patients treated, place of employment, performing arts professional associations, plus other helpful information.

The intent is to facilitate communication between performing arts PTs and to serve our patients who may travel or tour to other cities because of their art. Only Orthopaedic Section members will have access to this information. In order for others to find YOU, we are asking you to update your profile. Here is the link to the survey, which only takes 5 minutes to complete: https://www.orthopt.org/surveys/membership_directory.php.

Keep in mind that the PASIG offers a Student Research Scholarship of $400 to defray the cost of presenting your performing arts research at CSM. Research must have been conducted while a student. Once your abstract has been accepted to CSM, you can apply for the PASIG Scholarship. More details are found on our Web site: http://www.orthopt.org/sig_pa.php.

This fall, the PASIG will be electing a new President and a Nominating Committee member. Jason Grandeo (jgrandeo@bodydynamicsinc.com), Nominating Committee Chair, will be coordinating this effort, so please consider giving back to your organization.

Yours in the arts,
Leigh A. Roberts, PT, DPT, OCS

CORRECTION: The Business Meeting Minutes published in the last PASIG newsletter incorrectly indicated that Gina Pongetti was the owner of NeuroTour. The corrected information should read: "Gina Pongetti works out of Chicago for NeuroTour, which is owned by Carolyn Lawson and based in Atlanta, Georgia."

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#114 Donatelli's Pathophysiology and Mechanics of the Shoulder with Lab
San Diego, CA — September 17 – 18, 2010
Minneapolis, MN — October 2 – 3, 2010

#139 Surgical & Rehab Trends in Joint Arthroplasty
Midwest City, OK — August 14, 2010
Englewood, NJ — September 19, 2010
Pasadena, TX — October 9, 2010

#148 Evaluation & Treatment of Lumbar & Sacroiliac Spine: Maitland Approach
Santa Clarita, CA — August 28 – 29, 2010
Naples, FL — October 9 – 10, 2010

#152 Myofascial Release
Rockville, MD — August 14 – 15, 2010
Miami, FL — September 10 – 11, 2010
Atlanta, GA — September 25 – 26, 2010

#180 Geriatric Orthopedics with Dr. Jennifer Bottomley
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Englewood, NJ — Oct. 31 – Nov. 1, 2010

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1741_OP.indd 181 7/1/10 10:42 AM

ANIMAL REHABILITATION

SPECIAL INTEREST GROUP

EDUCATIONAL ANNOUNCEMENTS

6TH ANNUAL VETERINARY REHABILITATION SYMPOSIUM

The 6th International Association of Veterinary Rehabilitation and Physical Therapy Symposium will be held August 4-7th, 2010, at Auburn University in Auburn, AL. There will be programming on small and large animal rehabilitation, including basic as well as advanced clinical tracks. This is a great opportunity to learn more about animal rehabilitation as well as to network with other professionals working in the field. For more information and to register, go to http://vetrehabsymposium.weebly.com/

CSM 2011 - ARSIG PROGRAMMING

The Animal Rehabilitation Special Interest Group promises to bring an exciting and informative 3 hours of programming. Dr. Jan Van Dyke, DVM, CCRT will discuss types and recognition of zoonotic diseases in veterinary medicine. 'Red flags' will describe rehabilitation diagnoses with underlying medical causes. Please join us--it's bound to be 'contagious!'

TITLE: Veterinary Zoonoses, What You Need to Know Before You Treat That Puppy! and Veterinary Red Flags, Endocrine, Metabolic, and Medical Syndromes That Might Be Lurking in Your Canine Rehab Patient

Objectives: Zoonoses

(1) Understand the diseases that can cause severe illness when transmitted between human and veterinary patients.
(2) Recognize symptoms that might indicate a potential zoonosis.
(3) Recognize vectors of zoonoses and know how to address them.
(4) Understand the environmental conditions that can contribute to spread of zoonotic diseases.

Participants will learn about zoonses, diseases that can be transmitted between animals and people, and how they can present in veterinary practice. Methods to recognize these diseases and to prevent accidental transmission will be discussed. Disease vectors, environmental contamination, and disinfecting techniques will be clarified.

Objectives: Red Flags

(1) Understand the diseases that can present as apparent musculoskeletal impairments, but which have underlying medical causes.
(2) Recognize the endocrine and metabolic diseases common in the canine population.
(3) Recognize symptoms of impending crisis or those that would preclude pursuing rehabilitation therapy.
(4) Be able to discuss the pharmacodynamics of the drugs commonly prescribed for the above conditions, and how they would impact the rehabilitation therapeutic plan.

Participants will learn about the myriad diseases and medical conditions that can present as lameness, weakness, or neurological impairment, referred for rehabilitation therapy, but needing careful medical monitoring and management. Examples will be given of commonly seen endocrine, metabolic, and medical conditions of canine patients presented for rehabilitation. Symptoms that should alert the therapist to refer the patient back to the veterinarian will be listed and described as will the pharmacodynamics of commonly used medications to treat these disorders.

EDUCATIONAL HANDOUTS FOR YOUR CLIENTS:

These were contributed by Charles Evans, PT, CCRP, who works at Massachusetts Veterinary Referral Hospital. He kindly forwarded some of the handouts they use for their clients following surgery. Here is a general information sheet on preparing the house for an animal following orthopedic surgery.

PREPARING THE HOUSE FOR THE RECOVERING PET FOLLOWING ORTHOPEDIC SURGERY

The first 4 weeks after surgery are critical to your pet's recovery. So it is important that you start preparing your home environment before the surgery in order to clear the way for your participation in your pet's physical therapy plan.

Confinement

- Your dog's activities will have to be severely restricted during the important 6-10 weeks of recovery.
- He/she will have to be confined to a crate* or a small room that can be gated off (bathroom or laundry room).
- Try to place your dog in as quiet a place as possible during the early recovery phase.

Traction

- Good footing is very important during the early phase of recovery.
- If you have tile, wood, or linoleum flooring, cover the floor with rugs that have a rubber, nonskid backing to help with traction.

1741_OP.indd 182 7/1/10 10:42 AM

- We have a product called ShowFoot that is sprayed directly on to the dog's toe pads which will assist in providing improved footing on slippery surfaces.
- There should be a nonskid surface at the food and water bowls where the dog stands.

Activity Restrictions

- Make sure that everyone who will be coming into contact with your dog after surgery understands that your dog will not be allowed to jump onto or off of furniture, beds, or people.
- Your dog should not jump into or out of the car. There will be no playing with other dogs, toys, or people.
- Stairs must be blocked off so that your dog can not go up or down.

Walks

- All family members should be taught the proper way to walk the dog using the sling and leash in combination.
- This can be practiced prior to the surgery. Ask for a demonstration.
- Be sure to ask for a sling at the initial consult, when you drop your dog off for surgery or when your dog is discharged.

Sleeping Arrangements

- Your dog's sleeping place must be on the same floor of the house where it spends its time during the day.

Stairs/Ramp

- If you have more than 3-4 steps leading outdoors you may want to consider having a ramp built with nonskid treads or a rubber mat on it to provide good traction. This will ease your dog's entry and exit to the house for the first 4-6 weeks of rehabilitation.

Crate sizing

- When obtaining a crate for your pet, size is very important. Most stores that sell crates will have a sizing chart. A dog should be able to stand up in a crate without having to crouch. Your dog should be able to turn around in the crate but it should not be so big that the pet can defecate or urinate in one corner and sleep in the other. There should be enough room for your dog to lie down and have water and food bowls available. The crate should not be tall enough to allow your pet to stand up on its back legs. The crate should be seen as your dog's "bedroom" or "sanctuary."

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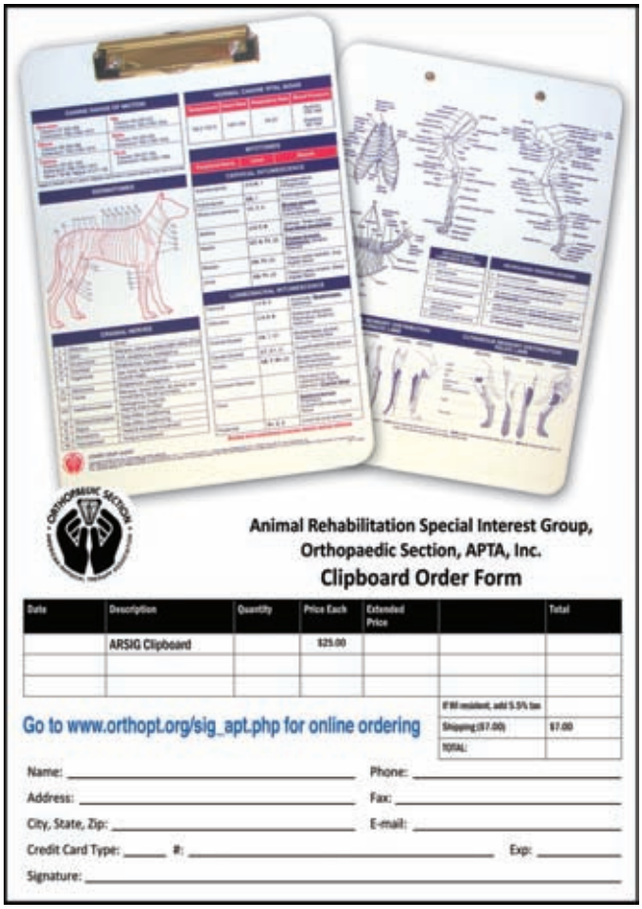

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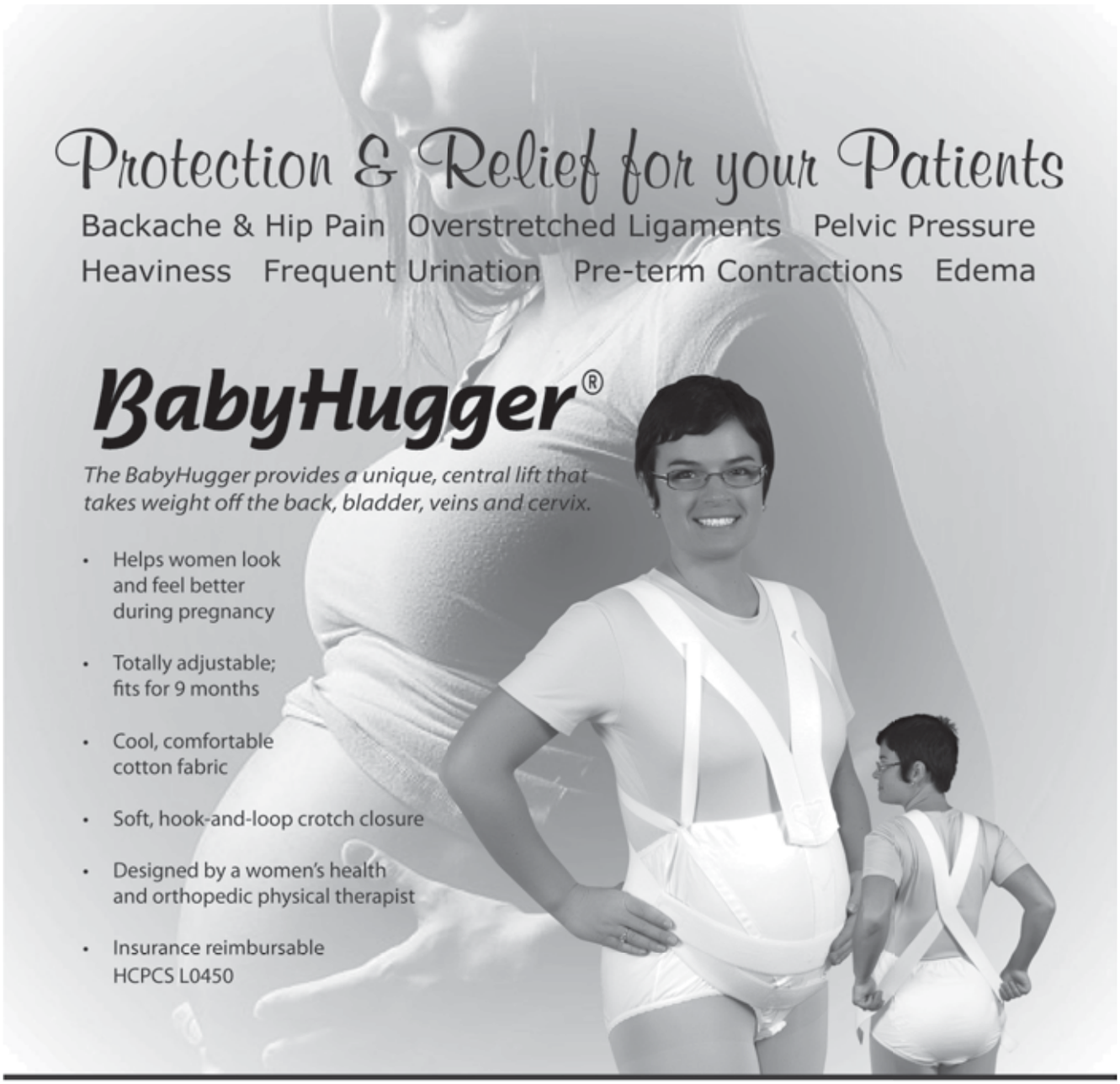

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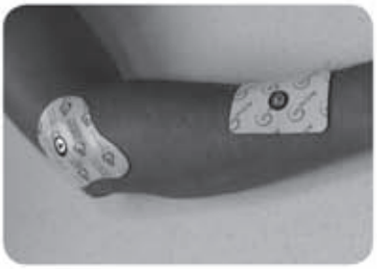

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