

# OCCUPATIONAL HEALTH

## SPECIAL INTEREST GROUP

### Message from the OHSIG

The election results were announced at the Membership Meeting in Anaheim at the Combined Sections Meeting. Lorena P. Payne was elected for a second 3-year term as President and Lori Deal was elected to the Nominating Committee. Jill Galper was honored for her many years of service with the OHSIG.

Becoming a member of the Occupational Health Special Interest Group is a benefit of your Orthopaedic Section membership. You can sign up on the Orthopaedic Section website under the OHSIG. Don't forget to check out the conversations taking place on the closed "Occupational Health SIG" Facebook page. Just ask to join!

### Physical Therapy Early Intervention in the Work Place

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In an increasingly competitive global market place, companies are constantly searching for new ways to reduce expenses. As worker's compensation (WC) costs have a significant impact on the bottom line of many businesses, reducing the incidence and severity of work-related musculoskeletal disorders (WRMSDs) has become an area of great interest for many employers. Work-related musculoskeletal disorders accounted for 32% of all injury and illness cases in 2014. In addition, there were over 350,000 cases of WRMSDs in the workplace, requiring an average of 13 days of lost time or limited duty in 2014.<sup>1</sup> America spends an estimated \$45 to 54 billion annually for WRMSDs.<sup>2</sup> While the overall numbers of injuries have remained relatively stable over the last few years, the cost to manage MSDs has continued to rise, especially for the spine.<sup>3</sup> One hypothesis points to an increase in the use of specialists and diagnostic imaging in the last decade that has resulted in increased costs, despite a lack of evidence to support their use.<sup>4</sup>

As the staggering costs of WRMSDs negatively impact their bottom line, many companies have begun to explore new and novel methods for the management of worker injuries. Some employers have sought to prevent MSDs from ever happening by promoting wellness and preventative services or redesigning the work environment with ergonomic improvements. Others have attempted to find innovative ways to treat injuries after they occur by managing musculoskeletal injuries on-site, with telemedicine, or by using alternative health care practitioners.

Today, more and more employers are looking to expand the role of physical therapy (PT) as a means of reducing work injury

cost and disability. In addition to traditional outpatient rehabilitation, physical therapists have increasingly become providers of occupational health services, ranging from wellness and prevention, ergonomics, and pre-employment testing, to early MSD reporting programs and on-site patient care. As experts in rehabilitation services for injured workers, therapists are often called upon to provide interventions that improve functional status and work tolerance in traditional outpatient clinic and on-site settings.

In the past many medical providers, employers, and payers have preferred to delay PT in the hope that injuries would resolve on their own during the initial phase following an injury. This "wait and see" approach has been generally considered to be a method to reduce WC expense by avoiding the cost of therapy. Despite the assumption that delaying PT can save money, research supports the use of early administration of PT for the management of WRMSDs.<sup>5-9</sup> These studies have demonstrated that early, aggressive, active functional rehabilitation improves patient outcomes and reduces overall MSD case costs by reducing the need for other, at times more expensive and less effective, treatments for many workers.<sup>5-9</sup>

Recently there has been a growing body of evidence that supports the use of an early intervention model that is predicated on prompt and active treatment of musculoskeletal injuries similar to a sports medicine approach, in which workers begin treatment as soon as possible, often on the same day as their injury.<sup>5-9</sup> The early intervention model is based upon the contention that the sooner an effective plan of care can be established, the more likely the patient will have a positive response to the intervention, a decrease in fear avoidance behaviors, less negative physiologic changes in response to decreased mobility, less time away from work, and, ultimately, a decrease in the overall likelihood of more invasive procedures.

### DISUSE AND EARLY INTERVENTION

Both acute and chronic injuries can result in significant physical, social, and psychological adaptations that can negatively impact the short, and even long-term, outcomes for an injured worker. At times it may seem intuitive to take it easy, and rest sprained ankles, strained backs, and other WRMSDs to allow the body to heal. However, soon after a worker begins to limit the use of an injured body part, physiological changes begin that can impact the neuromusculoskeletal system in ways that can negatively impact patient outcomes.

Like an injured athlete who cannot train or compete, it is easy to envision a worker losing muscle strength or aerobic conditioning after a prolonged absence from work. However, it is less intuitive to patients and employers that the central nervous system begins to modify the motor cortex to accommodate to the injury as well as the musculoskeletal system. There is evidence to suggest that the disuse that can follow an injury can result in neuroplastic changes to the M1 region of the motor cortex that is associated with the injured body part.<sup>10</sup> Neural plasticity appears to be an "intrinsic property of the brain"

that “takes place in response to afferent input and/or efferent demand,” allowing the brain to adapt to the activity or inactivity in which a person engages.<sup>10</sup> When a person or animal engages in or ceases to execute a physical activity, the motor map of the cerebral cortex can change. While these changes are typically reversible, they may alter movement patterns of the patient and contribute to longer term adaptations that can impede a return to normal activity and function.<sup>11-14</sup>

In addition to neuroplastic remodeling, changes to the soft tissues of the worker can begin soon after injury as well. When a worker limits the use of a sprained wrist by avoiding wrist motion, or keeps a sprained ankle immobilized, then the typical patterns of loading through tendons, muscles, ligaments, and even joint surfaces are altered. This reduced use can adversely impact the tissues of the body that depend on compressive and tensile loads to maintain their structure. Without tensile loading through tendons and ligaments, for instance, the ability to maintain glycosaminoglycan production diminishes.

Similarly, the reduction in physiological loading that accompanies disuse can cause significant changes in muscle. If a musculoskeletal unit does not forcefully contract for a long enough period of time, atrophy will ensue that can limit a worker's ability to return to the job. In addition, more insidious neurological effects can occur as well such as reduced proprioception and a decrease in nerve conduction to the muscle fibers.<sup>1</sup> A loss of general endurance and conditioning can also occur after a WRMSD that can impact functional status, especially when workers are away from the physical requirements of the job for an extended period of time.

As with physical changes to the musculoskeletal system, psychosocial issues can also begin to affect the functional status of workers soon after the onset of injury. When patients are sidelined from the regular activities of their job, home life, and leisure activities, they often experience frustration and, at times, even depression and anger. Workers may also develop a disproportionate disinclination towards activity and movement (fear avoidance beliefs) that can negatively impact their recovery. Recent studies have reported that high fear avoidance beliefs are associated with poor recovery, increased risk of prolonged absence from work, and even disability.<sup>16</sup>

The early application of PT can help to combat the psychosocial impact of WRMSDs. The early application of therapy interventions such as patient education about pathophysiology, pain management, appropriate physical activity, and home exercises coupled with skilled treatment, such as mobilization and therapeutic exercise, can reduce fear avoidance beliefs.<sup>17</sup> A positive experience that incorporates patient education on how and why early movement is important will facilitate a positive early engagement by the patient during the rehabilitative process. Additionally, findings suggest early therapy treatment leads to improved outcomes in disability, general health, social function, anxiety, depressive symptoms, mental health, and vitality.<sup>18</sup>

Wand et al<sup>18</sup> studied the impact of the timing of PT on biopsychosocial effects of injuries. In this randomized clinical trial, 100 patients with acute low back pain (LBP) were randomized into two groups. Both groups received information about the benefits of staying active and focused on function instead of pain during their medical examination. The early intervention group received PT immediately following the medical visit, whereas the late intervention group received PT 6 weeks later. The PT

intervention included both low and high velocity manipulation techniques, dependent on the discretion of the therapist. The outcome measurements used in this study were based on the Roland and Morris Disability Questionnaire.

At the 6-week follow-up, the early treatment group had “significantly lower disability and fewer symptoms of depression and anxiety and had better quality of life, vitality, social functioning, and mental health” compared to the group that received PT after 6 weeks. At the 6-month follow-up, the PT intervention group had “less depression, somatic distress, and anxiety, had better quality of life and mental health, and reported less interference of emotional problems in everyday activities than the later PT intervention group.”<sup>18</sup>

When treating WRMSDs limiting loss time from work is essential. The early use of PT has also been shown to improve the speed of recovery for the patient. A study by Linz et al<sup>19</sup> examining the effectiveness of occupational medicine center-based PT showed a mean number of PT visits to be 45% less than a national benchmark (mean visits 5.7 vs. 10.5). Eighty-two percent of the early group started PT within 6 days of injury, with 42% starting on the date of injury. Return-to-work outcomes at discharge from PT showed that 94% had returned to work.

## EFFECT ON THE USE OF OTHER INTERVENTIONS AND SPECIALIST VISITS

The early use of PT may not only positively affect the psychosocial impact of worker injury, but may also reduce the use of more expensive diagnostic imaging and other interventions such as steroid injections, prescription pain medication, and surgery. An estimated 53.9 million people in the United States report having one or more musculoskeletal disorders. These musculoskeletal disorders represent some of the leading causes of restricted activity days across the United States, with spinal disorders comprising the most expensive musculoskeletal region of the body. Increasing costs of care are highly correlated with a rise in prevalence of diagnostic imaging, spinal injections, surgeries, and opioid medication.

While at times necessary, injections and surgery come with a significant amount of risk for iatrogenic complications. In addition, opioid medications and other painkillers can have significant side effects and pose the risk of addiction. These interventions may be associated with longer periods of lost work days and a reduced quality of life.<sup>16</sup> Beyond just the associated risk of these more invasive treatments for WRMSDs, they can also have a significant impact on the overall cost of a case. Deyo et al<sup>20</sup> found a 108% increase in prescription opioid use for patients with LBP, resulting in a 423% inflation-adjusted increase in expenditure. They also determined that over 50% of regular prescription opioid users have an ICD-9 code associated with LBP.<sup>20</sup> Despite the rise in use of opioids, Deshpande et al<sup>3</sup> performed a systematic review in 2009 and found that benefits for opioid use in LBP was moderate at best. In addition, opioid use for acute LBP was found to correlate with poorer functional outcomes and subsequent long-term use.

Systematic reviews of lumbar fusion outcomes in WC patient populations have shown mixed results for efficacy. Recent studies on lumbar fusions in the WC setting have reported return-to-work rates of 26% to 36%, re-operation rates of 22% to 27%, and high rates of persistent opioid use two years after surgery. Other types of lumbar surgery in WC populations are

also acknowledged to have poorer outcomes than in non-WC.<sup>21</sup> Likewise, injections have been found to have questionable long-term benefit for WRMSDs for many conditions. While beneficial in the short term for some conditions, concerns have been raised that steroid injections may worsen outcomes long term for some tendinopathies.<sup>22</sup> Limited evidence also exists to support epidural corticosteroid injections for many types of LBP.<sup>23</sup>

The role of diagnostic imaging for LBP has come under increased scrutiny due to increase costs and lack of associated improvement in patient outcomes. A study by Battie et al<sup>24</sup> demonstrated that there appears to be some relation between genetics, body build, and early environmental influences in determining the degenerative changes of the spine frequently associated with aging. Degenerative changes on magnetic resonance imaging, myelography, and computer-assisted tomography, however, are not strongly related to LBP symptoms.<sup>24</sup> Current recommendations from the American College of Physicians are that (1) imaging is only indicated for severe progressive neurological deficits or when red flags are suspected, and (2) routine imaging does not result in clinical benefit and may lead to harm.<sup>23</sup>

In 2012, a large retrospective cohort study was conducted by Fritz et al that looked to examine the effect of early PT on the utilization of other interventions and opioid use. They examined a national database of employer-sponsored health plans with a total of 32,070 patients with an initial consultation to a primary care provider for an ICD-9 associated with LBP, all of whom had been seen by a physical therapist within 90 days. Subjects were then categorized into having been seen in PT within 14 days (early PT group) or after 14 days (delayed PT group). They closely examined the utilization of specific services for LBP in the 18 months following their initial primary care consultation. The study found that the early therapy group underwent fewer advanced imaging studies, received fewer spinal injections, used fewer opioid medications, and underwent fewer spinal surgeries than those who had delayed PT. They concluded that total medical costs for LBP were \$2,736.23 lower for patients receiving early PT.<sup>25</sup>

Similarly, Gellhorn et al<sup>26</sup> examined the effect of early PT on the use of other medical procedures for LBP. A total of 439,195 patients were identified through the Center for Medicare and Medicaid Services physicians' outpatient claims datasets who had been treated in 2003-2004 with a primary diagnosis of LBP without having treatment in the prior 6 months. Patients receiving PT in the acute (within 30 days) or subacute phase (31-90 days) were less likely to have surgery compared to patients receiving PT in the chronic phase (greater than 90 days). Early PT was associated with less health care consumption as participants had

fewer lumbosacral injections, physician office visits for LBP, and lumbar surgery.<sup>26</sup>

Childs et al<sup>27</sup> also reported a relationship between early PT and reduced health care use. This study included 122,723 patients who went to a primary care physician following an initial LBP episode and received PT within 90 days. Of these patients, 17,175 received early PT (within 14 days) that adhered to guidelines for active treatment. During a two-year time period, these patients had significantly less use of advanced imaging, lumbar spinal injections, lumbar spine surgery, and opioids than the patients who received other combinations of timing and adherence. Early PT patients also had 60% lower LBP-related costs as compared to 33.5% (23,993) of patients who had delayed and adherent PT (between 14 and 90 days).<sup>27</sup>

## ABSENTEEISM, PRESENTEEISM, AND THE FINANCIAL IMPLICATIONS OF EARLY INTERVENTION

In addition to reducing the use of imaging, injections, and other medical interventions, early PT has also been shown to aid in the reduction of lost work time and presenteeism for injured workers. Returning an injured worker to regular duty is a key goal for most employees and employers alike. Workers that are out of work or who are on restricted duty often wish for a return to their regular role as much as their employers do. Being out of work, or working "light duty," often carries with it significant financial hardship and, at times, social stigma for the worker. When looking at overall case cost, it has been reported that 66% of the total case costs are secondary to indemnity cost. Employer's bottom lines are negatively impacted by having to pay a worker who is out due to restrictions or who is working outside of their normal role. Therefore, effectively and efficiently rehabilitating a patient to a level of strength, endurance, and activity tolerance in which they can safely and sustainably perform the essential functions of his or her job is of paramount importance. In order to accomplish this, it has been shown that the timing of PT is an important factor in the rehabilitation process.

Ehrmann-Feldman et al<sup>28</sup> presented data that showed patients referred to PT within the first month following injury tended to return to work within a relatively short period of time, thereby reducing lost work days. Receiving PT within one month of the work injury was a strong predictor of return to work within two months of the back injury. Subjects in this study only had one episode of back pain. Absence from work for less than 60 days was labeled as "early return to work," whereas absence from work for greater than 60 days was labeled as "late return to work." Early PT was defined as PT within 30 days following the date of injury, while the other group was subjects not receiving PT or referred after 30 days from the initial date of injury.<sup>28</sup>

Hagen et al<sup>29</sup> studied the use of early intervention program's impact on reducing long-term sick leave for LBP. Patients ranged in age from 18 to 60 and experienced a sick leave of 8 to 12 weeks. At a 3-month follow-up assessment, 51.9% of the patients in the early intervention group returned to full duty, as compared to 35.9% in the control group. At the 12-month follow-up assessment, 68.4% in the early intervention group had returned to full duty work, as compared to 56.4% in the control group.<sup>29</sup> Arnetz et al<sup>30</sup> reported that early workplace intervention showed significantly decreased mean sick days as compared to the reference group. In this study, patients with physician-diag-

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nosed MSDs were randomized either to the intervention group or the reference group. The direct cost savings were \$1195 per case, yielding a direct benefit-to-cost ratio of 6.8.<sup>30</sup>

The Fritz et al<sup>25</sup> and Childs et al<sup>27</sup> studies reported similar cost savings. One reported that costs were \$2736.23 lower (\$3661.78 vs \$1810.67) for patients receiving early PT whereas the other study showed a \$1202.29 lower (\$3030.53 vs \$1828.24) mean than delayed care. In both studies, PT was used within 90 days of the initial physician visit.<sup>25,27</sup> A study by Gatchel et al<sup>31</sup> also revealed greater cost savings associated with early intervention compared to a non-intervention group. Both therapeutic and financial advantages of an early intervention approach to acute LBP disability were clearly demonstrated.<sup>31</sup> The results of a study by Pinnington et al<sup>32</sup> showed early intervention with PT in primary care cost less per episode of care versus conventional management for patients with LBP. A majority of the patients included in this study were able to initiate PT within 3 to 4 days.<sup>32</sup>

## PHYSICAL THERAPY REFERRAL AND UTILIZATION

Despite the evidence in support of therapy, and more specifically an early intervention model, to treat MSDs, physicians often use the “wait and see” approach to managing injuries. In a study on practice patterns for ankle sprain, only 9% of physicians surveyed reported that they frequently considered referring patients to PT despite evidence to support early mobilization of acute ankle sprains.<sup>34</sup> Published guidelines on knee osteoarthritis provide good evidence to support exercise and strengthening interventions, but do not specify whether patients should be referred immediately for these interventions or initially managed with pharmacology.<sup>16</sup> Employers also commonly view PT as an intervention that should be administered later in the course of care. Many employers and patients view PT as a means of rehabilitating MSDs “after they have had time to heal” instead of as a frontline means of reducing long-term disability. Although research demonstrates that early PT can lead to both greater cost savings and improved patient outcomes, at times employers are quick to argue that PT is over-used and increases the cost of care for their workers.

At times, physical therapists that work with the injured worker population must then act as educators to referral sources, employers, patients, and to payers. Therapists can play a key role in explaining to these stakeholders that initiating PT earlier can save them money, prevent worker disability, and reduce lost time and presenteeism. This can allow employers and their insurers to may make more effective decisions when it comes to authorizing therapy early in the course of care instead of waiting until the negative impacts of disuse have already begun to set in. Likewise, therapists in this setting can collaborate with physicians and other referral sources, demonstrating to them the value of not only early intervention, but also of therapy in general, in the management of WRMSDs. Therapists in the occupational health setting have the ability to demonstrate their high level of expertise as not only clinicians but also as components of the return-to-work process. Educating physicians and other referral sources about the expertise of therapists as orthopaedic clinicians can enhance their understanding of the value of PT. Research has shown that the more physicians know about PT and about orthopaedic care, the more likely they are to refer to PT.<sup>34,35</sup>

## CONCLUSION

Despite the fact that patients, employers, payers, and at times, medical providers often wish to take a “wait and see” approach to managing WRMSDs, the previously cited evidence supports the early use of PT for the management of injuries. Therapists that work in the occupational health setting, either in outpatient clinics or on-site, often have the ability to inform stake holders about the benefit of initiating therapy early in the course of an injury to optimize patient care and improve case outcomes. Currently, many companies have instituted aggressive early reporting programs that rely upon this concept to manage WRMSDs before they lead to serious, long-term injuries. By adhering to this sports medicine model of early treatment, early return-to-work, early motivation, and empowerment of the patient, companies have reduced injury costs and worker disability.

With escalating health care costs relating to WC, it is crucial to effectively manage cases to optimize both patient and employer outcomes. Therapists can optimize worker injury management by educating employers, workers, payers, and referral sources about the benefits and cost-effectiveness of providing therapy as soon as possible after an injury.

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