CE

2.5 ANCC Contact Hours

Management of Acute Lumbar Injuries in the Workplace

Ann Regina Lurati

Occupational acute lumbar injuries are a common injury. One intervention that is unique to occupational health is the determination of the amount of physical activity that an injured worker can perform without increasing the risk of further injury. Clinical recommendations suggest that workers continue to stay active; however, it is still the clinician's responsibility to determine the level of activity. The level of work activity is determined on a case-to-case basis and is done by evaluating the physical capacity of an injured worker and the job description. Current evidence-based guidelines suggest that staying active may actually reduce pain levels. The purpose of this evidence-based literature review is to outline the proper assessment and management of workers who have sustained a work-related low back injury. The related literature has been reviewed as well as red flags for more severe neurological conditions that require more in-depth evaluation. Determining the safe level of activity and guided return to work have been discussed.

Introduction

Occupational related acute lumbar injuries comprised approximately 42% out of the 387,822 musculoskeletal injuries during 2011 in the United States. The median days away from work was seven (Bureau of Labor Statistics [BLS], 2013). According to the National Institute of Occupational Safety and Health, the estimated cost of acute lumbar injuries is from $20 billion to $50 billion annually, (BLS, 2013).

Pathophysiology of Acute Lumbar Injuries

Acute lumbar injury may occur as a result of microtrauma. Microtrauma is defined as small tears in muscle fibers and/or connective tissue (Yoganandan et al., 1988). An acute lumbar injury may be referred to as a lumbar strain or lumbar sprain. A lumbar strain involves damage to the muscle fibers, whereas in a lumbar sprain, the ligaments and tendons are damaged, as well as muscles. When the muscle fibers, ligaments, and/or tendons are damaged or tore, bleeding and swelling occurs in that area. An inflammatory process begins in the damaged area generating prostaglandins and bradykinins that activate the nociceptors, which are sensory neurons that initiate the sensation of pain (Kidd & Urban, 2001).

Microtrauma may occur over time as a result of repetitive activity or during a single traumatic event. Acute lumbar injuries usually result from improper lifting techniques or excessive lifting loads. Activities that are associated with acute lumbar injuries are reaching while lifting, incorrect body mechanics, deconditioning, poor workplace design, repetitive activities, twisting, bending, and heavy lifting (Occupational Safety and Health, 2013). A worker may also sustain an acute lumbar injury from a trip, slip, or fall.

Evaluation of Acute Lumbar Injuries

The first step is to identify radicular signs that could indicate a herniated disc (see Table 1) (Hegmann, 2011). An examination of the lower extremities is performed, noting the absence or decreased sensation in either leg, via history provided by the patient and a pinprick test of the lower extremities. Motor strength is examined to identify muscle weakness and deep tendon reflexes tested to identify any potential spinal nerve involvement. The straight-leg-raising test is also performed to test for radiculopathy. During the straight-leg-raising test, the patient can either be sitting or standing, the affected leg is raised, which causes irritation of the sciatic nerve, and the patient will complain of pain.

The patient with a lumber injury must first be evaluated for any serious compression of the spinal nerves that may result in paralysis, such as cauda equina syndrome. Cauda equina syndrome is a condition in which the sacral and coccygeal nerves are compressed and is a surgical emergency. Then, other causes of low back pain can be a ruled out, such as a compression fracture, cancer, infection, or a dissecting or ruptured aortic aneurysm (see Table 2). If there is suspicion that the cause of the low back pain may not be a direct result of an occupational injury, a follow-up visit with a primary care provider needs to be scheduled to rule out any underlying pathologies. The primary care provider may need to order a complete blood count with an erythrocyte sedimentation rate, urinalysis, and a complete metabolic

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Table 1. Radicular Signs and Symptoms

Radiating pain
Numbness and tingling
Muscle weakness
Decrease reflexes

panel, as well as other diagnostic radiographs (Hegmann, 2011).

Treatment of Acute Lumbar Injuries

The American College of Occupational and Environmental Medicine follows the clinical guidelines for the diagnosing and treatment of acute lumbar injuries from the National Guidelines Clearinghouse (Hegmann, 2011). According to the National Guidelines Clearinghouse, lumbar sprains or strains require nonsurgical interventions. Nonsurgical interventions consist of ice/moist heat, medications such as nonsteroidal anti-inflammatory medications (NSAIDs), or acetaminophen, and a prescribed activity level. Muscle relaxants are prescribed for muscle spasms and to facilitate return to regular activities. Physical therapy may be considered for an exercise program or stretching program if there no improvement in 3–10 days (Hegmann, 2011). Bed rest for an acute lumbar injury is not recommended (Hegmann, 2011). An elevated body mass index is considered a risk factor for acute lumbar strain because of the excessive mechanical load (Shiri, Karppinen, Leino-Arjas, Solovieva, & Viikari-Juntura, 2009). According to Infante and Lortie (1996), nonsmokers have a better return-to-work rate. Methods to treat a lumbar strain are to reduce the inflammatory response by prescribing medications with anti-inflammatory effects and muscle relaxants that decrease muscle tone and prevent spasms. Activity level was prescribed to maintain muscle tone and prevent atrophy (Kidd & Urban, 2001). Physical activity is thought to increase production of endorphins and reduce connective tissue fibrosis (Langevin & Sherman, 2007).

NSAIDs are considered to be effective for short-term improvement with acute low back pain (Roelofs, Deyo, Koes, Scholten, & van Tulder, 2008). NSAIDs reduce pain and inflammation by inhibiting prostaglandins that increase blood flow, increase vascular permeability, and leukocyte infiltration, which cause swelling and tissue damage (Langevin & Sherman, 2007). Muscle relaxants are considered to be effective for short-term relief of pain spasm (Van Tulder, Tournay, Furlan, Solway, & Bouter, 2003). Continuous low-level heat wraps have been reported to be an effective therapy in both pain relief and increased mobility versus acetaminophen or ibuprofen for an acute low back injury (Nadler et al., 2002). However, cold therapy remains inconclusive in reducing pain levels and reducing sick days (French, Cameron, Walker, Reggars, & Esterman, 2005).

However, a new study indicated that acetaminophen does not affect recovery times or pain levels versus a placebo (Williams et al., 2014). Acetaminophen has little anti-inflammatory effects, ibuprofen, an anti-inflammatory, inhibits the synthesis of prostaglandins, thus decreasing swelling and pain (Simon, 2013).

Occupational medicine specialists possess the unique training to implement a treatment plan that places the injured worker in an environment that keeps the worker active, avoids repetitive or awkward activities that may reduce the risk of further injury (Hegmann, 2011). The injured worker is prescribed modified duty that entails minimal lifting, pushing, and carrying. There are clinical guidelines provided by the National Guidelines Clearinghouse that clinicians may use to determine whether an injured worker should be placed on full duty versus modified duty; however, the type of activity is still determined on a case-to-case basis. Assigning specific job duties is based upon the physical capacity of the injured worker and the job description. Once placed on modified duty, the injured worker is instructed that the same restrictions in activity levels are applied to nonrelated work activities.

There are general clinical guidelines for activity levels that are part of a return-to-work program (see Table 3). Generally, if the worker is 50% disabled from the injury, such as a limited range of motion and pain, the worker may be placed on modified duty for 3–10 days (Hegmann, 2011). If there is 75% improvement from the injury, the worker may be placed on mild manual labor for 7–10 days. Full duty may consider if there is a greater than 75% improvement. If the worker does not experience any improvement, then consider that the worker may have an intervertebral disc disorder (Hegmann, 2011).

Table 2. Differential Diagnosis of Acute Lumbar Pain

Muscle strain
Compression fracture
Herniated disc
Cauda equina syndrome
Osteomyelitis/infection
Malignancy
Spondylolisthesis
Ankylosing spondylitis
Osteoarthritis
Ruptured aortic aneurysm

Table 3. Activity Level

50% disabled (pain and limited range of motion)
Consider modified duty for 3–4 days
75% improvement (decrease pain and increase range of motion) increasing
Consider increasing workload for 7–10 days
Greater than 75% improvement (minimal pain and full range of motion)
Full duty
No improvement
Consider intervertebral disc disorder

Occupational medicine uses both objective and subjective findings when selecting the appropriate level activity for an injured worker. Personal variables such as age, gender, smoking history, or physical fitness level of the worker, as well as the actual job's physical demands, are a guide in determining the actual amount of activity that is allowed without increasing the risk of further injury. Once the worker is relatively pain-free and has functional mobility with a normal examination and is confident that he can tolerate the physical demands of his job, he may return to full duty. It is well established that by keeping the injured worker in the occupational setting, the worker minimizes lost productivity (Weir & Nielson, 2001).

Also, it is well documented that the longer the worker is absent, the less likely the worker will return to work (Hegmann, 2011; Infante & Lortie, 1996; Weir & Nielson, 2001). The data suggest that there is only a 50% likelihood that the injured worker will return to work if absent for more than 6 months. Although those workers who have been out of work for 12 months have less than a 10%–25% likelihood of returning to work (Cleary, Thombs, Daniel, & Zimmerline, 1995; Deyo, 1987; Hagen & Thune, 1998; Kelsey & White, 1980). To avoid lost workdays and promote early return-to-work status, workers are placed on modified duty as opposed to a nonwork status. When a worker is on a nonwork status, the employer may have to give other employees more work or the employer has to hire a replacement employee.

The longer the injured worker is absent from the workplace, the higher the costs (Cleary et al., 1995). There is lost productivity, decreased morale among the coworkers, because of an increased workload, and the cost of replacement employees. It is optimal, therefore, to keep the injured worker engaged in the workplace until he/she has recuperated from the injury. The injured worker is to stay at work but may have a reduction of the normal workload; this is referred to as modified duty. However, when a worker is placed on modified duty, there can be negative consequence, for example, such as a loss of work status, increased workload on coworkers, or there is an extra burden on the employer to find a replacement (Allard & Dembe, 2001).

Keeping the injured worker on a modified duty status decreases recovery times; however, it is unknown whether workers who remain on full duty have a different recovery times or time it takes to reach maximum medical improvement (MMI). There is a paucity of research that addresses whether full duty is an optimal approach to care of the injured workers.

Review of the Literature

The purpose of this review of the literature was to explore the outcomes for injured workers who stayed at work despite their injuries and best practices that decrease the time it takes to reach MMI. The review of the literature also focused on factors that may hinder a worker from returning to work.

DeVries, Brouwer, Groothoff, Geertzen, and Reneman (2011) examined a cross-sectional sample of workers who continued to work full time in various industries despite musculoskeletal pain. A cross-sectional sample of workers who were currently enrolled in vocational rehabilitation for various musculoskeletal pain disorders were found to be highly motivated to stay on the job and used positive coping mechanisms, such as distraction methods. However, there has not been a study that investigated negative consequences of working on full duty despite the injury and whether or not this may cause further harm to the employee or harm to the other employees. One of the functions of an occupational health clinician is to provide risk/benefits options to the injured worker so that optimal health choices are utilized. For example, workers with acute lumbar injuries are encouraged to exercise and quit smoking. Returning to work and staying at work, while recovering from an acute injury, has been reported to improve productivity and outcomes (Lotters & Burdoff, 2006).

DeVries and colleagues (2009) conducted another study that evaluated workers who continued to work full duty despite chronic musculoskeletal pain. Major reasons cited by the employees were that they considered work as a value, as a part of their self-worth, others may view work as therapeutic, in that they focus on problems at work and this distracts them from their pain. These employees may consider themselves as a valuable asset to the company, and may have many responsibilities at work, and finally, there are employees who need to work to generate income (DeVries et al., 2011). There were several methods used by the employer and employee to stay at work. These employees reported that they changed their work environment to promote proper ergonomics. Others stated that the employer provided alternative modified duty assignments such as clerical duties in order for them to stay at work. These employees also use healthcare services such as return-to-work programs that involve case management and physical therapy to stay at work.

Effective case management should be part of an early coordinated multidisciplinary intervention that can reduce absenteeism in the workplace and motivate workers to return to work (Fisker, Henning, Langberg, Steen, & Mortensen, 2013). The first step to early intervention is to identify risk factors that may predict prolonged absenteeism in the workplace. Risk factors were self-reported elevated pain levels, an older age of 50 or greater, female gender, a high self-reported impaired physical function, social or psychological problems, low job satisfaction, history of absenteeism, and economic gain such as retirement. A multidisciplinary team approach such as case management, physical therapy, and medical clinic visits was used to reduce absenteeism and promote early return to work.

The injured workers received an early evaluation and were closely monitored by the occupational health physician. Workers were also followed by a case manager, and had ergonomic evaluations in the workplace. Employees who were provided instructions of proper exercise techniques that reduced pain levels returned to work sooner with absenteeism reduced (Fisker, Henning, Langberg, Steen, & Mortensen, 2013).

There are prognostic indicators that healthcare providers can use to determine duration of workplace absence. Lotters and Burdoff investigated workers who

were absent in the workplace for 2–6 weeks because of general musculoskeletal disorders (Lotters & Burdoff, 2006). The most common factors that contributed to a prolonged absenteeism were older age of workers, perceived workload, poor general health status, the worker's own perception of the ability to return to work, and a history of chronic lumbar pain. Workers who experienced a slower rate of return to work were those who had a high-perceived workload and increased pain level. However, workers with a high functional disability and a lower pain level returned to work sooner. Pain level was a contributing factor to whether or not the injured worker returned full duty.

Infante and Lortie (1996) also evaluated the prognostic factors for returning to work after a first-time episode of low back pain. It was found that nonsmokers had a better return-to-work status than smokers. Employees who had jobs that were less repetitive and allowed for unscheduled work breaks were shown to have an improved return-to-work rate. Elevated pain levels were another prognostic factor that played a role in whether or not an employee would return to work sooner (Infante & Lorte, 1996).

High physical workload and low job satisfaction may increase the risk of prolonged work absenteeism (Hoogendoorn et al., 2002). Workers with acute lumbar injury were more prone to prolonged absenteeism than were those workers who had jobs that required increased flexion and rotation of the trunk, lifting, along with a history of low job satisfaction. A lack of a social support from coworkers and supervisors was also contributing factors. Elevated pain levels were cited to be an attributing factor as well. Methods for improving social support, such as assistance from coworkers and supervisors, were cited as part of a strong return-to-work program (Hoogendoorn et al., 2002).

The employer may reduce the workload for the injured worker. Hagen, Erickson, and Ursin (2000) studied the effects on a light mobilization program that was implemented early that reduce long-term sick leave for low back pain. A light mobilization program consisted of core strengthening and stretching, as well as modified duty. In this prospective cohort study, the groups that were provided with a light mobilization program that included physical therapy and were told to stay active returned to work sooner than those patients who received traditional care, which included only medications and were scheduled fewer clinic visits (Hagen, Erickson, & Ursin, 2000).

Light mobilization programs for the treatment of low back pain is not only effective as part of a return-to-work program but it is cost-effective as well. Skouen, Grasdel, Haldorsen, and Ursin (2002) studied the effects of a light multidisciplinary mobilization for male workers with low back injuries from various labor backgrounds. It was demonstrated that those workers who were enrolled in a light mobilization program return to work sooner. In addition, patients who were in poor physical condition, for example, those workers who had a history of smoking, had a slower return-to-work time. Case management was found to be effective for women when issues, such as family situations, job satisfaction, and job workload, were addressed (Skouen, Grasdal, Haldersen, & Ursin, 2002).

In summary, it is well documented that physical activity, pain management, and addressing personal factors such as job satisfaction contribute to an injured worker returning to work sooner. This literature review was to evaluate the best practice guidelines for an injured worker who promotes early return to work and decreases the amount of lost workdays. Methods such as case management and activity levels are effective with reducing the time to reach MMI. Finally, addressing prognostic factors such as elevated pain levels were identified and addressed to promote early to return to work.

Implications for Clinical Practice

Implications for Employees

Primary prevention of musculoskeletal injuries in the workplace must focus on wellness. The employee needs to participate in a regular exercise program that focuses on generalized strengthening and stretching. Secondary prevention involves the employee health nurse providing education and screening clinics to identify these employees and have them follow up with their primary care providers for treatment if indicated.

Obesity, osteoporosis, and degenerative joint disease are all contributors to developing musculoskeletal injuries in the workplace (BLS, 2013). Women with osteoporosis are at risk for injury because osteoporotic bones may fracture during heavy activity because of the excessive or repetitive forces (Wickens, Lee, Liu, & Becker, 2004, p. 271). Recommendations for women's health promotion and prevention of disease are exercise and nutritional supplements of vitamin D and calcium, as well as weight-bearing exercises, and if indicated, dual-energy x-ray absorptiometry scan screening for osteoporosis (CDC, 2013). Many workplaces are now focusing on wellness for their employees.

Once the injury occurs, tertiary care is focused on management that is guided by pain control and improving functional mobility. Medications such as NSAIDs and muscle relaxants have been highly recommended for short-term use to improve pain levels and increase functional mobility (Roelofs et al., 2008). However, muscle relaxants should be prescribed for muscle spasms only (Van Tulder et al., 2003). Treatment plan should consist of NSAIDs and muscle relaxants that are effective with few side effects. Instructions may be needed as to the prescribing of NSAIDs, for example, need to be taken as a scheduled dose to maintain therapeutic blood levels. If NSAIDs are associated with gastrointestinal upset, instructions may be provided to take the medication with food. Patient education needs to include the use of acetaminophen that may not be an optimal choice for musculoskeletal injuries because of its limited anti-inflammatory effects (Williams et al., 2014). Workers who take a daily aspirin may continue with the aspirin because it is an anti-inflammatory; however, NSAIDs need to be avoided (Limmer, Ittel, & Wietholt, 2003). Low-level heat therapy may be considered as a first-line therapy for all nurses because there are no reported side effects, inexpensive, and improves pain levels with functional mobility (Nadler et al., 2002).

The prescribing of an activity level is another important step in the management of acute lumbar injuries. Physical therapy consultations were usually initiated after 2 weeks; however, according to the National Guidelines Clearinghouse, physical therapy may be initiated 3–10 days after that initial clinic visit if there is not satisfactory alleviation of pain or mobility function (Hegmann, 2011).

Activity levels are applicable not only in the workplace but during leisure time outside of work. It should be stressed that leisure time activity or staying active is associated with decreased pain levels and increase in functional mobility as compared with being sedentary (Bohman, Alfredsson, Hallqvist, Viingard, & Skillgate, 2013; Dahm, Brurberg, Jamtvedt, & Hagen, 2010). Staying active is associated with a greater benefit in women (Bohman et al., 2013). However, the effectiveness of specific exercise therapy and physical conditioning programs continues to be debated (Hayden, van Tulder, Malmivaara, & Koes, 2005; Schaafsma et al., 2013).

The prescribing of an activity level is a critical part of treatment, and occupational health providers need to prescribe an exercise program at the initial visit and encourage the injured worker to remain active, especially if the injured worker is assigned sitting duties. Occupational health providers need to encourage workers to adhere to an exercise program, not only with improving pain levels and increased functional mobility but also in the prevention of all types of musculoskeletal injuries. An exercise program prescribed by physical therapy may involve proper back exercises that avoid excessive twisting, repetitive movements, and awkward positions that may worsen low back pain.

Employees who have sedentary jobs should be allowed to stand and stretch during work hours. Modified duty assignments should avoid sitting duties and allow the employee to stand and stretch every hour, as well as avoiding or minimizing repetitive movements and awkward positions, such as twisting and squatting. According to the literature, the best practice model is a light mobilization program in which staying active decreases pain levels and sick days versus bed rest. Educational programs concerning activity levels and continuous monitoring of the injured worker may be appropriate.

Implications for Employer/Workplace

Primary prevention of workplace musculoskeletal injuries needs to focus on providing yearly education and refresher training for all employees with regard to safe patient-handling practices and proper body mechanics. Ergonomic evaluations of the workplace, with an implementation of a lift team, may be considered. Secondary prevention should focus on screening for at-risk employees during a yearly employee health fair. Employers and healthcare providers need to emphasize the importance of staying active, focusing especially on those workers who have assignments that are sedentary. Workers who may occasionally have to perform a strenuous task may experience early muscle fatigue, which may lead to injury (Wickens et al., 2004, p. 273).

Tertiary prevention involves an intensive case management program that promotes return-to-work status with the goal of reducing or preventing lost workdays. One hundred percent compliance was achieved in both groups of nurses with regard to clinic and physical therapy appointments. Nurse practitioners who have not had formal education and training in the field of occupational medicine may need to have a focused orientation to address the issues of prescribing modified duty versus dull duty.

It is the responsibility of the occupational health nurse practitioner to understand the job requirements of the employee and explain the potential risk of increased pain, decreased mobility, and potential re-injury before assigning an occupational-related activity levels. The injured worker may return to full duty with restrictions, as long as they can do the essential functions of their job.

Conclusion

Acute lumbar strain usually lasts about 6 weeks or 42 days regardless of the treatment (Michigan Quality Improvement Consortium, 2012). Best practice continues to prescribe an activity level that is based on the actual job function and the physical capacity of the injured worker. A successful return-to-work program promotes the idea that staying active reduces pain levels and sick days. Healthcare providers need to monitor these workers to prevent further injuries and to ensure that theses nurses remain active, not only at work, but on time off from work. NSAIDs and muscle relaxants are also used for the short term; however, new evidence is being introduced that heat therapy may be just as effective in reducing pain levels and increasing functional mobility. Case management is used to identify and monitor at-risk employees. Compliance with the treatment plan is critical in any return-to-work program.

A successful employee health program should encourage the injured worker to stay active with continuous case management to minimize workers' compensation costs and reduce lost workdays. Maintaining a healthy workforce may decrease the risk of injuries among employees.

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