WORK-RELATED MUSCULOSKELETAL PREVENTION: A CASE STUDY OF AN INDUSTRIAL MSD PREVENTION PROGRAM

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BACKGROUND

In the United States it is estimated that the total economic cost of work-related injuries is $160 billion per year. In 2005, $80 billion was spent on wage and productivity replacement, $31.3 billion in medical costs, and $34.4 billion in administrative costs. In 2005, 60% of work injuries were musculoskeletal disorders (MSD). Musculoskeletal disorders includes a variety of conditions including sprains, strains, cumulative trauma disorders, contusions, and spinal pain. The average MSD costs $17,065 in medical and indemnity costs according to the National Safety Council.

On the job injuries can have an enormous effect on the viability of local and national economies. Employers are often looking for better ways to prevent and manage work injuries, claims, and associated costs. As physical therapists we are uniquely qualified and positioned to become the profession that provides the answers to employers' MSD problems. Our unique knowledge base of musculoskeletal pathology, kinesiology, and biomechanics allows us to intervene at numerous stages during the work injury lifespan. From prevention to management, we have the answers that employers and workers need to reduce MSD. This paper describes one program that has been successful in reducing work-related MSD in a packaging manufacturer.

COMPANY INJURY HISTORY

Graphic Packaging Corporation (GPC) is a leading provider of paperboard and integrated paperboard solutions to beverage and consumer products producers. In the location that the current program was implemented the focus was converting raw cardboard material into attractive, color printed packaging for dry and frozen food producers. The facility had a history of MSD that primarily involved the arms and spine. For the 3-year period (1997 to 2000) prior to the program, the facility averaged 20 recordable injuries per year; of these they were averaging 16 work-related MSD per year. Fifty percent of injuries were sprains/strains, 10% to 20% were cumulative trauma with the remaining injuries due to a variety of causes such as slips or trips. Prior to the implementation of the injury prevention program GPC had not implemented any significant programs or efforts to address their MSD problem. The interventions recommended for this client were designed to assist them to first prevent injuries and second improve the management of the injuries and complaints that did occur.

Phase 1: Injury Prevention Program

Initially, a detailed analysis of the historical injury data for the current year and the previous 2 years was performed. Particular trends in body region, injury type, and job were noted. This was followed by a systematic analysis of all production related jobs in the facility. The purpose of the analysis was to identify risk factors that may contribute to MSD. Common risk factors include heavy lifting, pushing, pulling, grasping, and pinching. Often these were associated with awkward body or joint postures and/or excessive repetitions. Poor choices on the part of the worker contributed in most cases. For example, poor lifting mechanics was indentified frequently. Improper tool use or selection was another common choice that contributed to their MSD risk. Based on the analysis findings, a list of recommendations was generated to guide GPC in beginning to address their problem. The recommendations identified workstation layout and tools/equipment design modifications that would be helpful. In addition, a heavy emphasis was placed on implementing an education process to influence habits and choices that seemed to contribute to injuries. We developed a 3-level training program to address all levels on the workplace hierarchy from the production worker to top level management. The first level of training was targeted at the management team from the plant manager to the direct production supervisors. Subjects addressed in this session were designed to create awareness and commitment among the management team on the issues in the workplace from risk factors to appropriate response to an injury. The management training was quickly followed by training for employees. Our goal with this training was to create a desire to change poor work habits or choices and to motivate the employee to improve the commitment to care for their body both at work and home. The final session was directed to the safety team and provided them with training and tools to continuously analyze and identify risk factors that may contribute to the development of MSD. The team consisted of both management and production level employees who were interested in identifying solutions to the MSD problem.

Phase 2: Injury Management

After implementation of the prevention phase, we developed an injury response or management process to assist GPC in earlier, more effective identification and response to MSD. The program involved creating a culture that encouraged, even welcomed the reporting of minor MSD complaints. Employees were given access to a physical therapist who would provide first-aid level interventions to assist the employee in the self treatment of their complaints. This was made available to all employees for all MSD complaints regardless of whether they were work-related. First-aid level interventions used in this program were those defined by OSHA as first-aid (Figure 1). The physical therapist was guided by an algorithm of care that was developed with the input of a board certified occupational medicine physician. A significant emphasis was placed on the employee modifying work technique and habits that seemed to be associated with their condition and providing them with exercises that could be performed at work and/or at home to facilitate healing. Figure 2 illustrates the types and frequency of interventions provided by the physical therapist. The physical therapist was very familiar with all the jobs in the facility and their physical demands and risk factors. He was able to provide job specific advice that was meaningful to the employee. In addition, the physical therapist consulted with the plant safety manager and the employee's supervisor regarding interventions they might implement to address risk factors that were likely

OSHA ALLOWED FIRST-AID INTERVENTIONS

Visits to a physician or other licensed health care professional _____for observation or counseling

The conduct of a diagnostic procedure, such as x-rays, and blood tests, including the administration of prescription medications used _____ for diagnostic purposes

Using a non-prescription medication at non-prescription strength

Administering Tetanus Immunizations

Cleaning, Flushing, or soaking wounds on the surface of the skin

Using wound coverings such as bandages, Band-Aids™, gauze pads, etc.; or using butterfly bandages or Steri-Strips™

Using hot or cold therapy

Using any non-rigid means of support, such as elastic bandages, wraps, non-rigid bak belts, etc.

Using temporary immobilization devices while transporting an accident victim

Drilling of a fingernail or toenail to relieve pressure, or draining fluid from a blister

Using eye patches

Removing foreign bodies from the eye using only irrigation or a cotton swab

Removing splinters or foreign material from areas other than the eye by irrigation, tweezers, cotton swabs or other simple means

Using finger guards

Using Massages

Drinking fluids for relief of heat stress

Figure 1.

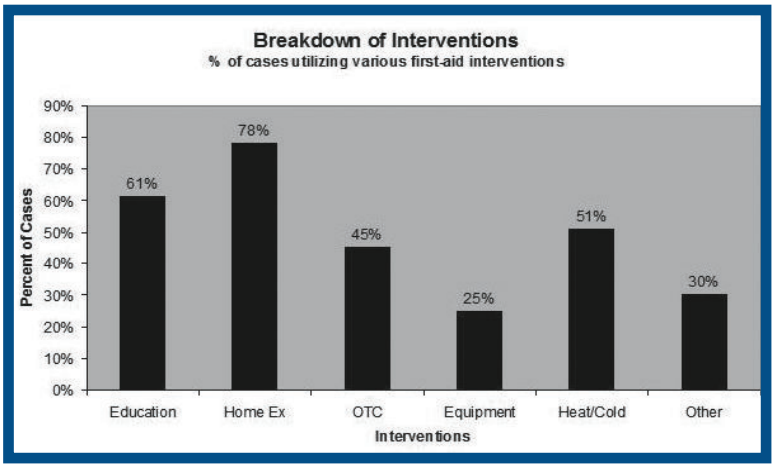

Figure 2.

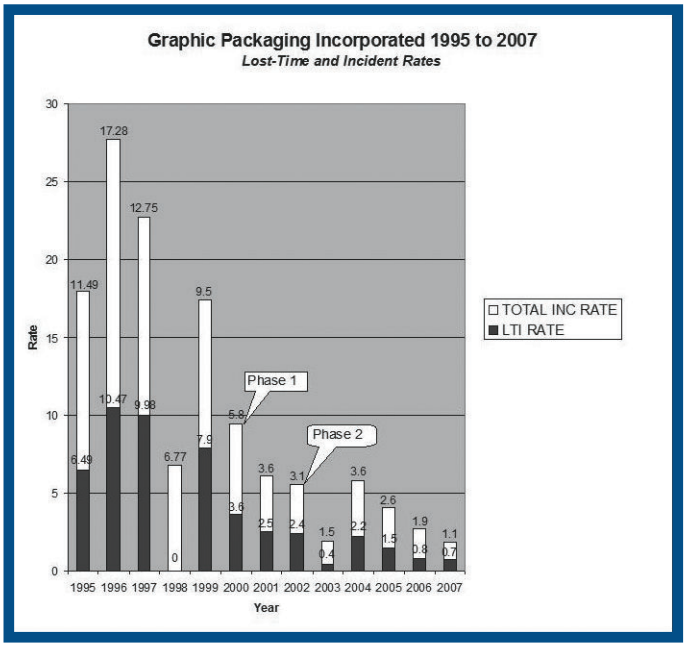

Figure 3.

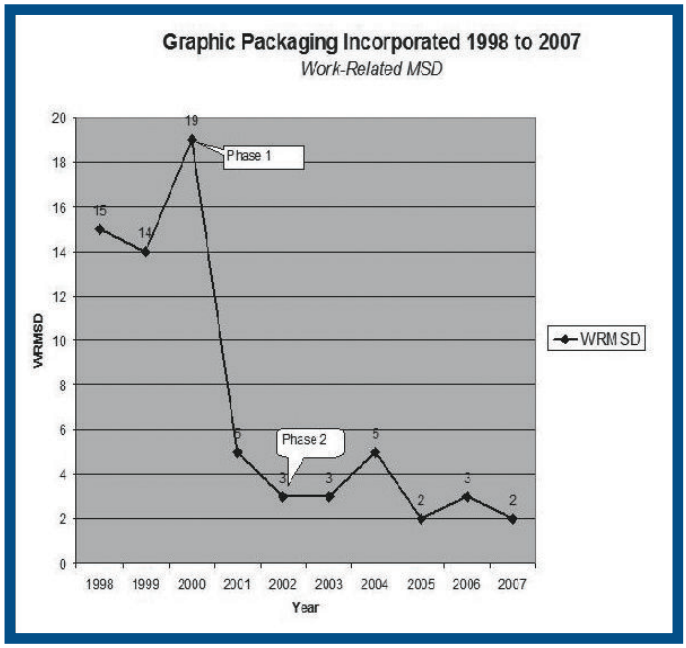

Figure 4.

contributing to the employee's complaints. When examination finding indicated a condition that required medical attention because it was either not musculoskeletal in nature or the MSD had progress to a point beyond the level of first-aid interventions, the physical therapist worked with the safety manager and the employee to have the employee seen by a physician. Often this was a referral to a specialist in the area of the employee's condition. Over time the physical therapist and safety manager developed an informal panel of specialists who were willing to see cases sent from the plant on a preferential basis.

OUTCOMES

Figures 3 and 4 illustrate the results of the GPC MSD prevention and management program. Based on GPC OSHA 300 log and other internal safety statistics provide to by GPC there was a 75% reduction in MSD the year following the implementation of the ergonomics program and this reduction has been maintained to this date. Figure 5 illustrates the outcomes of the onsite physical therapist first-aid interventions on worker compensation claims for MSD. Over the period of 6 years, 90% of all cases seen by the physical therapist were resolved through first-aid level interventions.

DISCUSSION

Prevention and management of MSD in the workplace has been given much attention over the past 20 years. Many approaches have been implemented by employers in an effort to control the costs associated with MSD. Over a period of 7 years, GPC was successful in preventing and managing MSD by using a physical therapist to develop and implement an ergonomics and first-aid program. Numerous factors were important in the success of this program.

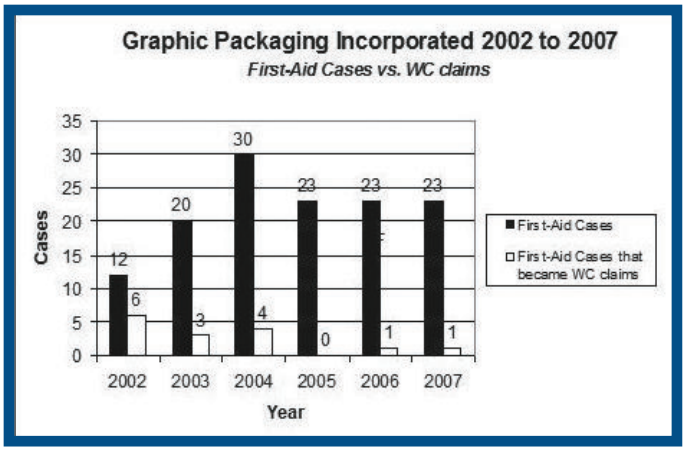

Figure 5.

Trickle Down Ergonomics

In any workplace there is a culture that is pervasive. This is a direct function of the management that exists in the workplace. It determines what actually gets priority and what does not. When the question of ergonomics comes forward, the culture of the workplace becomes a huge factor. More importantly the culture and priorities of the management team determines the success of injury prevention programs. If there is not commitment at this level, the efforts of a safety manager, ergonomist, engineers, and employees usually do not produce results. The vast majority of people are reactive in nature, no matter how much sense prevention makes it often comes with many unknowns. There is a "leap of faith" involved on the part of the employer and the management team. This is especially important when you are preaching that the employer encourage the reporting of even minor aches and pains. When the entire management team is not committed to the program from top to bottom, the success of the program is virtually dead before it has a chance to start. In our program we spent considerable effort to create commitment in the management team. This was done through formal classroom education and frequent interaction as the program began. We addressed questions and concerns and helped them understand why we made various recommendations. When management became truly committed to the process, there was a noticeable change in the employee's involvement in the program. Employees began coming forward earlier with MSD complaints than in the past would have been ignored until the problem had became more significant.

Earlier is Better

A second key for success related to how early employees who were experiencing MSD signs and/or symptoms would report their problems and seek intervention. Prior to the program employees typically would not report MSD's until well into their development. This led to more costly care, increased disability, and unnecessary suffering. The typical North American culture values a certain amount of stoic behavior. This can be very much a part of the management and employee mindset leading to dismissing the earliest warning signs of MSD. Often employees who are suffering from MSD feel foolish, hesitant, or even guilty reporting the MSD. They delay reporting symptoms they feel may be related to their job often until the disease process is well developed and difficult to treat. Changing this attitude was a very important goal of the prevention program. The message of "earlier is better" was repeated and emphasized throughout the program. Employees participated in training directed at reducing work fatigue through personal ergonomics at work and home. In addition, they were taught how to recognize the early warning signs of MSD and appropriate self-care and reporting. Over time the culture changed and employees began to report earlier and more frequently.

Direct Access to Onsite Physical Therapist

When working with employers to reduce MSD, accessibility to treatment services is paramount. In the traditional medical model the worker leaves the workplace to be seen by a physician at a clinic or ER. Sometimes this is an occupational medicine clinic, sometimes a family practitioner, sometimes in an emergency department. There may be a great amount of variability in the accessibility to these services from distance, timeliness, or experience. In our model the worker was seen by the physical therapist onsite at the workplace in a direct access model. This provided many advantages over the traditional medical model. First, the physical therapist was able to essentially perform 2 evaluations, the person and the job. This is a huge missing piece in the typical care of an injured worker with MSD. The practitioner usually only has one piece of the equation, the clinical presentation of the patient. Many assumptions are made based on the presentation of the patient and their report of the causes of the complaints. This can lead to care that is more costly than need be both in dollars and human suffering. We found that if we evaluated the persons MSD and then evaluate their interaction with the job that the ability to resolve their complaints was greatly enhanced. We often found counseling the employee in alternative work procedures or techniques was extremely helpful in resolving his/her complaints without requiring interventions beyond first aid.

Second, the physical therapist is the ideal practitioner to address MSD complaints. The skill set of the physical therapist allows them to make an accurate diagnosis of the complaints and their etiology as it relates to work tasks. In most cases we were able to make recommendations that fell within OSHA's definition of first-aid to resolve the workers complaints.

Third, an additional benefit of onsite intervention is psychological. Often the individual just wanted to know what his/her problems were and to what extent it had developed. They were relieved when they were educated on the pathology and etiology and how they could manage their symptoms on their own. When an employee is sent to a clinic, the severity of the injury in the mind of the employee appears to be greater. After having medical testing, being prescribed medications and/or physical therapy the severity of the problem has now become greater in the mind of the patient. Contrast this with the person with the same complaints seeing a physical therapist onsite who identifies the causes of their complaints, educates them of the typical recovery process, and assures them that the majority of these conditions are self-limiting. The physical therapist then helps them modify their risk factors and provides them with self-care tactics. This approach is consistent with current best

practices for treating acute low back pain and can be applied to most MSDs. In our experience this is the best model for addressing the majority of work-related MSD.

Understanding Federal and State Laws

A number of federal and state laws and agencies directly affect what type of interventions the PT can provide, at what point they can be provided, and under what type of supervision. OSHA defines what interventions are first aid and what is deemed medical treatment (Figure 1). When an injury or illness requires treatment beyond first aid, it must be recorded on the OSHA 300 log. Many companies use the information on this log as their metric for safety. The 300 log contains information of the type of injury, date of injury, where it occurred, how it occurred, whether it required restricted duty or time away from work. When an injury is treated by first aid, it does not need to be recorded on the 300 log and may not need to be reported to the employers state regulatory agency and/or to their workers compensation provider. This can have huge implications in costs considering many work comp insurances and third party administrators charge a fee up front to open a claim.

A state may adopt OSHA's definitions of first aid or the state may have there own definition. This will dictate when the company must report an injury to the state and whether or not they need to report a claim to their insurance company. Understanding these laws and regulations can have a significant effect on the success of these types of programs. For example, OSHA states that anyone can administer first-aid level services regardless of medical training. However a state may define first aid services provided by a medically trained individual as medical treatment and require reporting to the state as well as to the insurance carrier. This injury would not need to be reported on the 300 log but it would need to be reported to the state and a claim may need to be opened with the insurance company. A number of scenarios of this type may exist depending of which state the company is operating in.

The state physical therapy practice act will determine what level of direct access the physical therapist can have and therefore how the program may be structured. The program would potentially be much more effective in a state with full direct access vs. partial or no direct access. Understanding these laws is pivotal to implementing this type of a program. Understanding these issues can help the physical therapist develop a program that meets the need of the employer to reduce MSD cases and the associated costs.

Visibility and Trust

For any prevention program to be successful those that it targets to must be continually reminded of the program and its benefits. The old adage "out of sight, out of mind" definitely applies to a program like ours. This relates to the effort of addressing complaints earlier in the development. The employer should regularly remind their employees of ergonomic principles, work toward ergonomic improvements, and encourage the use of the onsite physical therapist for minor symptoms the program will not realize its full potential. The employer needs to have someone accountable to do this. This often is a safety or human resources professional. One of the best things the PT can do to help with this effort is to perform plant walk-through on a regular basis to make sure they interact with employees at their jobs. We found that our presence was a trigger for additional requests for a consultation with the physical therapist. Often these were for personal issues or very minor symptoms. We feel that this was a huge part of our success; it built trust and acceptance. When employees are more comfortable with the process and the practitioner, they are more willing to get involved which results in better outcomes.

CONCLUSION

Many companies are suffering from the effects of unnecessary MSD problems. These disorders are very preventable. This article reports on the experience of one program that was successful in reducing MSD in a packaging manufacturing facility. It illustrates how a combination of ergonomics and improved injury management tactics reduced our clients MSDs by 75% and has maintained this reduction to the current date. In the future, work-related MSD management will occur earlier and be more job specific. The physical therapist is the practitioner of choice to provide the answers to work-related MSD. This is an area that numerous competing professions are targeting including athletic trainers, massage therapists, and chiropractors. As physical therapists now is the time to aggressively capture this important practice niche and provide the needed answers for employers and their employees.