



Ergonomics

Introduction to MSDs

Inside This Issue

- 1 What are MSDs?
- 2 MSDs vs. Acute Injuries
- 2 MSD Warning Signs
- 4 What's Next?
- 4 Further Reading and information

Unlike acute injuries such as lacerations, many MSDs develop gradually over time. They may also seem like they are just part of the job or part of aging.



With carpal tunnel syndrome, numbness and pain are common symptoms affecting the thumb and some of the fingers as shown above.

What are Musculoskeletal Disorders?

Musculoskeletal disorders (MSDs) is the term often used to describe medical conditions affecting the soft tissues of the body including muscles, tendons (connect muscles to bones), ligaments (connect bones together), cartilage (often between bones such as the knee and ribs) and nerves. In the past, other terms used to describe these conditions included repetitive strain injury (RSI), cumulative trauma disorders (CTDs) and repetitive motion disorder (RMD).

Some of the more common types of MSDs include strains, sprains, tendonitis, and ligament damage. Body parts commonly affected by work include the low back, knees, and shoulders. Strains and sprains are often a high percentage of MSD statistics such as workers' compensation claims. Technically, strains affect muscles and tendons, whereas sprains affect ligaments. Strains are more common than sprains. Examples of specific MSDs are:

- Tennis elbow (lateral epicondylitis) is not just for tennis! Tasks that require bending the wrist back or rotating the forearm increase risk of tennis elbow.
- Carpal tunnel syndrome results from the tendons in the wrist becoming swollen and placing pressure on the median nerve. Repetitive gripping or pinching can cause tendon inflammation.
- Anterior cruciate ligament (ACL) tears are well known among athletes, but miner workers also have ACL tears. They are caused by high forces placed on the knee when the knee is twisted.
- Low-back pain is the most prevalent of all musculoskeletal disorders. The majority of low-back pain cases are not associated with a particular anatomical or structural cause (referred to as idiopathic). However, some cases are due to specific mechanical problems such as when a herniated disc puts pressure on nerves in the back.

MSDs vs. Acute Injuries

Unlike acute injuries such as lacerations, many MSDs develop gradually over time. They may also seem like they are just part of the job or part of aging.



MSDs often take longer to heal than many acute injuries, resulting in :

- *more lost work days*
- *greater medical costs*
- *greater worker disability.*

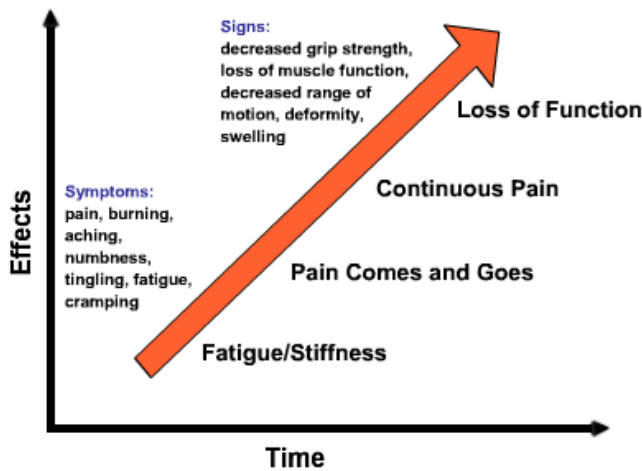
One of the most important distinctions between MSDs and common acute injuries, such as lacerations and contusions, is the progression course. Acute injuries often occur in a second or two and are a result of a single incident. MSDs often develop gradually with no specific onset point, and take longer to heal than acute injuries. The figure below shows statistics that illustrate how age impacts median days lost for musculoskeletal injuries relative to all injuries. As we age, recovery from injury takes longer. Also, the likelihood of reoccurrence of previous injuries is more prevalent as we age. Therefore, it is never too late to address ergonomics deficiencies in the workplace.



Median days lost for musculoskeletal injuries relative to all injuries/illnesses (MSHA Injury Data, 1992-2002). (1)

MSD Warning Signs

Two key aspects of minimizing the incidence and severity of MSDs are the early recognition of the warning signs and taking action to prevent further progression. As was mentioned earlier, many MSDs are characterized by gradual onset, and workers often experience discomfort or pain for some time before reporting a problem. Oftentimes, workers think this discomfort or pain is just part of getting old and think it is just something they must accept. A proactive approach to ergonomics aimed at reducing or eliminating exposure to MSD risk factors is the preferred approach. Integrating ergonomics principles into the workplace through education and training of workers and management is the primary way to reduce exposure to risk factors, which lead to MSDs (2). Responding to workers' health and safety concerns and addressing ergonomic deficiencies in a timely manner can help minimize progression from discomfort or pain to more serious outcomes that involve medical treatment and time away from work, or possibly permanent disability.



Possible Pathway to MSDs

MSD injuries may begin as fatigue or stiffness; as the injury progresses, the pain comes and goes and eventually the pain becomes continuous. If action is not taken, the injury can result in loss of function. (2)

The key to prevention of MSDs is to understand what they are, how they progress and their root causes. Once the causes are identified, they can be systematically eliminated. The result is a better work life and home life. Companies can go a long way to minimize these injuries, which will, in turn, improve their bottom line. A positive responsiveness and attitude regarding early reporting of injuries and potential injuries is important. A recent study examined factors related to supervisors’ responses to reports of injury or pain/discomfort by workers. Employee interviews indicated that one of the most important roles employees perceive for their supervisor is providing accommodations after an injury including help setting up the accommodations and making ergonomic changes to their workplace. Communication and responsiveness were the next two most important roles. (3)

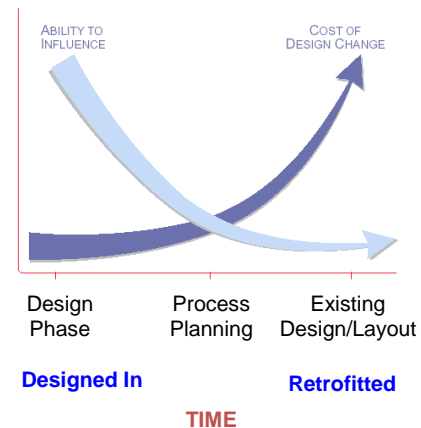
Although a proactive approach to ergonomics is the best way to avoid MSDs, implementation of ergonomic interventions can also be used to help workers return to work sooner after an MSD.

An ergonomics approach to reduce MSDs can be successful as a stand-alone activity or as an add-on to an existing process, such as a company’s safety and health program. Regardless of the approach, it is important to fully maximize the effectiveness of the ergonomics process by integrating it with other processes that affect worker safety and health and the workplace.

Examples of processes that could benefit from ergonomic input include:

- Purchasing new equipment and tools
- Purchasing personal protective equipment
- Designing new or modifying existing facilities, production lines or work stations
- Determining work shifts and schedules
- Modifying work practices or procedures

Applying ergonomics to these processes at the planning stage will not only prevent the introduction of risk factors into the workplace, but it will avoid costly reengineering efforts to correct situations. Incorporating ergonomics into planning moves an ergonomics process from a reactive to a truly proactive mode.



Including ergonomics in the design phase maximizes its impact with minimal costs, while waiting to address ergonomics with an existing design or layout, minimizes impact with maximum costs.

Ergonomics is a science serving to bridge production and safety. Its focus is straight-forward - designing for a better fit between workers and the methods, tools, equipment and workstations used by workers. A better fit results in safer and healthier jobs. If you are ready to move ahead and address ergonomic issues at your mine, it is important to first consider how you will do this to have an effective process. Some critical elements necessary for successful implementation and integration will be provided over several newsletters and links as a guide for getting started. Remember, it is important to plan for success.

What's Next?

The next newsletter will introduce the first of several risk factors for musculoskeletal disorders, the important parameters of risk factors that are measured when performing workplace evaluations, and examples of risk factors commonly encountered in the mining industry.

References and Further Reading:

1. Porter, W.L., Mallett, L.G., Schwerha, D.J., Gallagher, S., Torma-Krajewski, J., and Steiner, L.J. (2008). Age Awareness Training for Miners, Information Circular 9505, DHHS (NIOSH) Publication No. 2008-133.
<http://www.cdc.gov/niosh/mining/products/product157.htm>.
2. Torma-Krajewski, J, Steiner, L.J. and Unger, R.L.. Ergonomics Awareness Training for Miners, Information Circular 9497, DHHS (NIOSH) Publication No. 2008-111.
3. Shaw, W.S., Robertson, M.M., McLellan, R.K., Verma, S. and Pransky, G. (2006). A controlled case study of supervisor training to optimize response to injury in the food processing industry. **Work**, 26, 107-114.



The content for this newsletter is from DHHS (NIOSH) Publication No. 2009-107, Information Circular 9509, Ergonomics Processes: Implementation Guide and Tools for the Mining Industry (in press), Authors: Janet Torma-Krajewski (currently Colorado School of Mines, formerly NIOSH, jtorma@mines.edu), Lisa Steiner (NIOSH, Lsteiner@cdc.gov), Robin Burgess-Limerick (University of Queensland, robin@hms.uq.edu.au). Additional contributor is Patrick Dempsey (NIOSH, pdempsey@cdc.gov).