According to the Occupational Safety and Health Administration (OSHA, n.d.-a), one-third of all worker injury

and illness cases were musculoskeletal disorders (MSDs). MSDs are those injuries and illnesses that affect

the muscles, nerves, ligaments, tendons, and blood vessels within the body. In the workplace, these are

oftentimes caused by ergonomic issues. However, what is ergonomics? Ergonomics is the science of fitting

the job to the worker, not the worker to the job. By incorporating ergonomics into the workplace, we can

lessen the possibility of musculoskeletal disorders (OSHA, n.d.-a).

The following are some examples of work-related MSDs:

 carpal tunnel syndrome,

 tendonitis,

 rotator cuff injuries,

 epicondylitis,

 trigger finger,

 muscle strains,

 muscle sprains, and

 lower back injuries.

Ergonomic Hazards

Although the proposed ergonomics standard was rescinded, OSHA does have ergonomic guidelines to help

protect employees from workplace MSDs. Employers are required to provide a safe and healthy workplace for

employees; however, incorporating ergonomic programs in the workplace not only benefits the worker, it

benefits the business as well. As humans, when we do not feel well or are uncomfortable, we may not put

forth our best efforts at work. In fact, if the pain or discomfort becomes too severe, we may call in sick to work.

Increased absenteeism may cause work to fall behind, resulting in a profit loss for the company. This pain or

discomfort also decreases the worker’s quality of life outside of the workplace. If a worker calls in ill, the

company may have to pay another employee overtime to perform the work. If the employee is permanently

unable to perform the assigned tasks, the employer will have to hire another individual and train them, which

can be an expensive and time-consuming process.

Work-related MSDs are covered by workers’ compensation. If a company has a higher number of claims, it

will negatively affect its experience modification rate (EMR), which will, in turn, raise workers’ compensation

insurance premiums. On the other hand, if workers feel well, they are less likely to call in and are able to work

and produce a quality product. Therefore, a company that takes the initiative to correct potential issues in the

workplace that may result in worker MSDs may experience the production of a higher-quality product,

decreased absenteeism, and a higher profit margin. Safety pays!

Back and shoulder injuries are among the most common MSDs and are often related to manual material

handling (OSHA, n.d.-a). Efforts should be made to reduce the amount of manual lifting needed in the

workplace. This can be accomplished by providing mechanical material handling devices and designing

workplaces to reduce the need for lifting. However, it is not likely that all manual lifting can be eliminated, so

workers need to understand the mechanics of lifting and the limitations of the human body. Training in proper

lifting should include the why as well as the how. Workers are told to lift with their legs and not their backs and

to hold the load close to their bodies, but do they really understand why this is the best way to lift? Not

following these two lifting rules puts excessive strain on the lower back, and using hands-on demonstrations

can increase worker understanding and compliance (NIOSH, 2011). For example, have workers lift a fivepound box from the floor while holding the box close to the body, and then have the worker repeat the lift

while holding the box at arm’s length. The box weighs the same five pounds but will feel much heavier.

Increasing the distance from the body increases the load moment, also known as torque. As the moment

increases, additional forces and stress are placed on the back muscles and spine. We can calculate the load

moment using a simple formula:

**Load Moment = Weight x Distance**

Distance is expressed in feet (ft.), and the weight is expressed in pounds (lbs.). The unit for load moment is

foot-pounds (ft-lbs.) and describes the force required to lift or hold the load. If we hold a five-pound box close

to the body, the force to hold the box equals the weight of the box (5 lbs. x 0 ft. = 0 ft.-lbs., so the formula

does not apply). If we hold the box two feet away from the body and apply the formula, we get 5 lbs. x 2 ft. =

10 ft.-lbs. The force required to hold the box has doubled.

Lifting a 5-pound box away has the effect of lifting 10 pounds on your shoulder.

(OSHA, n.d.-b)

If there is one thing that you will need to drive home to employers and employees, it is the need for early

reporting of signs/symptoms of MSDs. Pain is the body’s early warning system. It tells us when something

has been injured or is being injured, is under stress, or is diseased. All too often, we ignore that early warning

system. For example, how many times at work have you noticed that your lower back hurts, or that your neck

is extremely tense? What did you do? Most people will take some ibuprofen, aspirin, or Tylenol to take the

edge off and then go back to work, in most cases continuing the same actions that are causing them

discomfort to begin with. If the employee continues to self-medicate and does not change the behavior

causing the problem, it will get worse and possibly lead to an injury. This is why it is imperative that

employees are taught to spot the early warning signs of potential MSDs and to report them. Early reporting

allows the occupational safety and health (OSH) professional or members of the safety team to intervene and

evaluate the employee’s workstation or work tasks to determine what is causing the problem and how it can

be remedied.

Cumulative Trauma Disorder

Cumulative trauma disorder (CTD) is a wide-ranging category of ergonomic-related injuries or illnesses that

affect muscles, tendons, and ligaments. CTD is not an actual disease, but rather a concept used by medical

professionals to understand or describe what caused or contributed to the condition (Orthopod, 2015).

Included in this category are repetitive stress injuries (RSI), overuse strain (OS), and occupational overuse

syndrome (OOS). There are many factors that contribute to CTDs:

 repetitive motion,

 poor tool or equipment design,

 fatigue,

 temperature extremes,

 vibration,

 awkward postures,

 static postures,

 length of exposure, and

 extent of exposure.

Consider for a moment a stone cutter. He or she hits a stone 100 times and there is no visible damage to the

stone; however, on the 101st time that the stone is hit, it splits in two. It is not that the 101st hit was any

harder than the previous 100; rather, the stress from all the hitting accumulated and caused the stone to

finally fracture. This is exactly how CTDs occur. Each exposure to the hazard increases the stress on the

body, ultimately resulting in injury. Our bodies are like a spring; if you continue to wind the spring and never

take the tension off, the spring will break. So, unwind the spring. Relieving the tension does not take

significant time out of the workday; taking micro-breaks throughout the day greatly decreases the stress on

the body. Rotate the joints, stretch, and do not forget your eyes. Did you know that increased eye strain also

affects the neck and back? If you do a considerable amount of work in which your eyes must focus close-up,

take a minute or so to focus your eyes in the distance and look back and forth. The effort costs nothing, and

the results can save you from suffering pain and discomfort all while saving the company money in lost time

and workers’ compensation costs.

Employers often cringe when the OSH professional brings up the possibility of making ergonomic

improvements to a workplace. The general belief is that purchasing ergonomic tools, workstations, etc., will

be a costly venture. Ironically, not only do ergonomic interventions not have to be costly, but they can result in

thousands of dollars of savings. For example, a large hospital laundry service was experiencing a significant

amount of work-related lower back injuries. The injuries were a result of removing laundry from the very

bottom of the large wheeled laundry totes that they used. These totes were approximately 3 feet high. The

employees did not have a problem taking the laundry from the top of the cart, but as they got down to the last

pieces in the bottom of the tote, they had to bend over deeply to reach them and lift primarily with their backs.

The OSH professional easily identified what the problem was, but there was no money in the budget for a tote

tipping device. One of the laundry workers came up with an idea. The worker took a large piece of rigid plastic

and cut it to the size of the inside of the tote. He then drilled a hole in each corner of the plastic and ran a

bungee cord from each corner to the corner of the tote. When the laundry was put into the tote, the plastic

went down with the weight of the load. As the worker removed laundry from the tote, the bungee cords would

bring the platform up, allowing them to remove the laundry without having to bend over. The improvement

costs a mere $24 to make. The hospital incorporated these self-rising platforms into all of their totes for a

minimal cost. Over a year’s time, they saved over $10,000 in workers’ compensation claims. More

importantly, the laundry workers were no longer being injured.

Although the ergonomic innovation applied in the example above was a huge success, not all are. As an OSH

professional, you must ensure that your so-called fix does not create a new problem. For example, prior to the

1980s, many grocery store cashiers spent several hours per day typing numbers into their cash registers as

they were checking out customers. As a result, many full-time cashiers experienced a repetitive stress injury

(RSI), called carpal tunnel syndrome (CTS). In an effort to reduce these injuries, barcode scanners were

introduced. The cashier would now take the item and run it across a surface that had a laser device that

would read the barcode and automatically input the price. The incidence of CTS dropped drastically within the

first year; however, the industry then saw an influx of epicondylitis and shoulder injuries. When they did an

ergonomic evaluation of the cashiers’ stations once again, the problem quickly became evident. Cashiers

were now taking the item, picking it up from the conveyer belt, and running it across the barcode scanner.

They were performing this motion thousands of times per day, causing excessive stress on the elbow and

shoulder. The new answer was barcode guns and self-checkout lanes.

Occupational safety and health is a work in progress. As an OSH professional, you must realize that you will

never get to a point in the field where everything is as safe as it can be and no changes are required. You

must be vigilant, continue to assess, reassess, improvise, adapt, and overcome. You are not going to have all

of the answers. Utilize your resources. Talk to the people on the front line who work at that machine or task

every day. They are the subject matter experts for that particular job. Why would you not involve them in the

safety aspects for it? Set yourself up for success, and do not forget to think outside the box.