

Ergonomics: Good News for Healthcare Workers

First, the bad news ...

Each year 1.8 million U.S. workers experience work-related injuries caused by overexertion or repetitive motion – injuries known as musculoskeletal disorders (MSDs). About 600,000 of those are serious enough to require time off work and account for one-third of all workers' compensation costs each year.

Although most people may be more familiar with the term cumulative trauma disorder (CTD), the term MSD, or WMSD (work-related musculoskeletal disorder), is a broader and more widely used term.

The Occupational Health and Safety Administration (OSHA) defines MSDs as injuries and disorders of muscles, nerves, tendons, ligaments, joints, cartilages, and spinal discs. MSDs are caused by excessive and repeated physical stress on the musculoskeletal system – the hands, wrists, elbows, shoulders, neck, and back.

According to OSHA, the average cost per incidence of an MSD is estimated to be \$12,000, which includes lost work with full wages, replacement wages, lost productivity, and medical treatment (not including surgery). If surgery is required, the average cost bumps up to \$43,000 per incidence according to the American Society of Orthopedic Surgeons.

Currently, MSDs cost U.S. industry \$15 to \$20 billion in workers' compensation costs with total costs as high as \$45 to \$60 billion per year.

However, these figures do not include the effects of these injuries that are not always easy to see:

- The hidden costs due to slower production, lower quality, job retraining, unemployment, and long-term disabilities.
- Or the lifestyles of millions of people that are affected every year due to the pain and discomfort of these unfortunate injuries. Workers with severe MSDs often are unable to return to their jobs or even manage the simplest of tasks, such as combing their hair.

MSDs in the healthcare industry

In the healthcare industry, MSDs represent over 70 percent of the workers' compensation costs in most hospitals. And, according to the CDC (Centers for Disease Control and Prevention), rates of occupational illnesses and injuries in the healthcare field have risen over the past 10 years.

Staff reductions, the transition from inpatient to outpatient care, and the increasing age of healthcare employees have contributed to the mental and physical load on healthcare personnel often leading to stress and injuries.

As organizations attempt to maximize the productivity of their workers, they can sometimes be overzealous in the demands they place on workers' physical abilities.

Healthcare workers face a wide range of hazards on the job, including musculoskeletal disorders, back injuries, and stress. A big problem for caregivers is back and neck pain due to awkward postures or lifting patients.

Over time, chairs with no adjustment features, workstations that don't fit workers, or exam tables that force caregivers to bend awkwardly over patients can contribute to MSDs for a healthcare organization's workers in office and clinical settings.

Another problem facing the healthcare industry is that women, who represent nearly 80 percent of the healthcare workforce, disproportionately suffer some of the most severe MSDs. This is not because their bodies are more vulnerable to MSDs, but because a large number of women work in healthcare jobs associated with heavy lifting, awkward postures, or repetitive motion.

Most people aren't aware that activities need not be strenuous, uncomfortable, or painful to develop MSDs. So, poor posture and bad work habits often go unnoticed before symptoms of an MSD occur.

MSDs may develop gradually over time. Symptoms of MSDs may not appear for months and may continue, even after many days of rest. MSDs will become progressively worse over time, if exposed to the risk factors that caused them.

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Why are MSDs increasing?

MSDs have become more common recently due to several factors:

- **Aging workforce:** Older workers are more susceptible to injury because of the natural degenerative process associated with age. As people get older, they cannot do the same jobs over and over again without risk of injury.
- **Sedentary work and lifestyles:** Lack of activity can result in loss of muscle tone, which increases susceptibility to physical problems.
- **Computer work:** Many computer tasks lack activity, variety, and movement, and can be performed for greater lengths of time at faster keying rates resulting in greater stress on the body.
- **Stress:** Greater levels of stress can contribute to the development of MSDs.
- **Increased diversity of workforce:** People vary widely in all their dimensions and differ considerably in shape and overall size creating fit problems with furniture and equipment. This can result in awkward postures or pressures on the body when forced to adapt to furniture and equipment that doesn't fit.

How do MSDs affect the body?

MSDs can affect different areas of the body including upper limbs, head and neck, and upper and lower back:

- Tendon problems are the most common injury among those who perform administrative tasks.
- Disc problems in the upper or lower back often result from prolonged sitting or standing.
- Nerve problems usually involve pressure on the nerve in a joint structure, such as carpal tunnel syndrome, which is damage to the nerves in the wrist.
- Muscle problems are often a result of strain caused by excessive or forceful motions. Exertions requiring force but no movement can also weaken tissue and make it more susceptible to injury. Static or tensed postures as well as repetitive movements can overwork muscles leading to damage. Tension neck syndrome and low back pain are common muscle problems.

What are the risk factors for MSDs?

The work environment, technology, individual physiology, and non-work activities all influence MSDs. These are referred to as risk factors. It is usually a combination of several of these factors that increase the likelihood of developing an MSD:

- **Repetition:** Performing an identical task over and over, such as prolonged keying.
- **Holding one position:** This includes static exertions and any position where a limb or joint is held unsupported for long periods without moving, such as holding a mouse with a static grip.
- **Awkward postures:** This means bending or twisting a limb or joint beyond a neutral range. Fixed awkward postures contribute to muscle and tendon fatigue and joint soreness. For example, when keying, wrist extension can increase carpal tunnel pressure. Physicians and other caregivers often spend hours daily bending awkwardly over patients.
- **Local pressure:** Leaning a body part on a hard or sharp edge increases internal pressure on muscles, tendons, and nerves. This can cause aggravation and swelling.
- **Use of force:** Abrupt motions or acceleration of motions while using force increases stress on soft tissues. This includes pushing, pulling, or lifting weight. More muscular force is required when awkward postures are used because muscles cannot perform efficiently.
- **Non-work activities:** Repetition and force are present in many sports and hobbies and can contribute to overuse of muscles and tendons, such as throwing a baseball, playing a musical instrument, or doing needlework.
- **Predisposing factors:** Smoking, diabetes, obesity, pregnancy, vitamin B-6 deficiency, rheumatoid arthritis, and poor vision have been shown to increase a predisposition to development of MSDs.

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Now for some good news ...

Because of the increasing number of injuries caused by repetitive motion, excessive force, and/or awkward postures and positions, ergonomics has become a critical factor in workplace safety.

Most people have heard of ergonomics and think it has something to do with seating or with the design of car controls and instruments. It is, yet it is much more.

Ergonomics touches upon many aspects of people's lives, from work to leisure activities, to sports, and to comfort, health, and safety.

The science of ergonomics

Ergonomics is the science of fitting the physical environment and the job to the worker's capabilities or limitations as well as to the tasks performed.

While the field of ergonomics involves many complex sciences – biomechanics, orthopedics, human factors engineering, psychology, and even optometry – the approach to ergonomics can be simple and straightforward by focusing on workers' relationships to their jobs.

Ergonomics programs can often prevent work-related MSDs that occur when there is a mismatch between the environment, the worker, and the task.

Ergonomics involves an understanding of body size, weight, and gender characteristics – all in order to properly fit workers to the work environment and their tasks.

That's where the science of anthropometry plays a large role. Anthropometry studies human body dimensions. It uses joints and creases on the body as landmarks for measurements.

Anthropometric surveys present a picture of population demographics including age, gender, ethnic characteristics, and sizes of people – from the 1st to the 99th percentile – to give us a better picture of the smaller and larger segments of workers. The surveys reveal that people vary widely in all their dimensions and differ considerably in shape and overall size.

In addition to the 17 inches in height and 140 pounds that separate a 1st-percentile female from a 99th-percentile male, there are gender-related differences in bone structure and weight distribution and infinite variations in limb lengths and body contours.

Today's workforce is more varied in its demographics than ever before. There are more women, Asians, and Hispanics, many of whom are smaller in stature than their North American or European (especially male) counterparts who seem to get taller each generation. There also are more people at middle and older ages and more people with disabilities.

Even among a group of people of the same gender, ethnic origin, age, and stature, there can be significant variation in bodily proportions.

Ergonomics in the workplace

Knowing sizing needs can help in designing and adjusting work environments that best meet the needs of the users to improve their efficiency and prevent injuries.

Ergonomists use anthropometric information about people's size, their ability to handle information and make decisions, their ability to see and hear, and their ability to work in extremes of temperature. An ergonomist studies the way that these factors vary in a group of people.

With this information, the ergonomist, working with designers and engineers, ensures that a product or service will be able to be used comfortably, efficiently, and safely, not only for "average" people, but also for the whole range of people who use the product.

OSHA's proposed ergonomic standard

The importance of ergonomics in the workplace is reflected in the involvement of OSHA, which is in the process of investigating, on an industry-by-industry basis, the risk factors present in the work environment.

Since not all risk factors apply to every industry, OSHA is taking an individual look at those industries that have the highest incidence rate first (trucking and transportation, nursing homes, manufacturing, retail sales, etc.). In the meantime, the OSHA General Duty Clause is still in effect stating that employers that are aware of hazards present in the work environment must make employees aware of these risks and work to eliminate them.

Whereas, today's typical ergonomic programs usually cover the nature, causes, treatment, and possible ways to avoid MSDs, the proposed OSHA standard is even more comprehensive. It requires employers to provide training to employees about MSD hazards, how to recognize and report MSD signs and symptoms, and measures for reducing and eliminating hazards.

If the OSHA standard is adopted, employers will have to continuously monitor and fix jobs deemed risky by OSHA.

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Ergonomic solutions

There is no one ergonomically correct solution that can be applied to every workplace because people are different and their jobs are different. The correct ergonomic solution is as individual as each person.

There are a host of ergonomically designed solutions that can be implemented:

Redesigning jobs: Redesigning jobs can be a valuable preventive measure to remove, reduce, or dilute risk factors. It's often possible to expand job descriptions so that each worker performs a more varied group of tasks throughout the day, especially nonstressful ones and ones that use different muscle-tendon groups and postures.

Taking breaks: Studies show that regular rest breaks, including stretching, are beneficial in reducing stress, shoulder and neck pain, low back discomfort, and eye strain. Frequent breaks of 30 seconds to three minutes can be very effective.

Changing habits: Some organizations have instituted programs that involve raising awareness of the value of good work habits, doing individual evaluations, and providing diligent follow-up.

Reducing stress: Stress reduction programs may include education about stress recognition, coping behaviors, relaxation methods, health behavior, and personality typing.

Lifting carefully: Workers can learn to lift objects from a low position close to the body especially if shelving can be strategically rearranged. Mechanical devices such as carts or wheeled tables can be used to reduce the number of times a given object has to be lifted. Lifting devices, team lifting, and training in lifting procedures can reduce injuries to caregivers who must lift patients.

Adjusting the environment: Good workstation design is critical to creating a healthy, comfortable, and task-efficient work environment. Arranging a work area to accommodate the person who works there is probably the easiest form of ergonomics.

A good way to avoid static or awkward postures is to avoid static furniture.

Many awkward positions can be reduced simply by rearranging the work area. Placing work surfaces in a U shape, for example, allows the worker to visit several work positions by swiveling rather than overreaching.

Adjustable-height tables are valuable for overall posture change. Some desks and tables adjust from sitting to standing height.

The adjustment of a chair, as it relates to a person's body and to a keyboard, work surfaces, and the task being done, has a powerful influence on reducing risk factors.

Articulating arms let users bring light, phones, and other equipment with them as they move around in a workstation. Headsets free up the arms and shoulders for frequent phone users. Mobile document holders allow workers to change the angle and position of a document so they can move their head and neck occasionally and still see their work.

Ergonomically designed carts can contribute to safe handling of loads in hospitals as well as offices to reduce spine, wrist, and upper and lower body muscle injuries due to incorrect lifting and pushing.

To implement ergonomic solutions, there's a wealth of information available. The following are just a few:

- OSHA's comprehensive approach to ergonomics includes job hazard analysis and control, training, MSD management, and ergonomics program evaluation.
- The National Safety Council is a government agency that funds research and produces literature on ergonomic issues.
- The American National Standards Institute (ANSI), a national coordinator of voluntary standards for industry, issues voluntary guidelines for workplace design as well as for managing work-related MSDs of the upper extremities and neck.
- The Business and Institutional Furniture Manufacturer's Association (BIFMA) has written ergonomic guidelines for visual display terminal (VDT) work environments.
- The Illumination Engineering Society provides lighting guidelines for VDT work environments.

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But there's still more bad news ...

There is an anecdote told by some ergonomists: A new employee arrives at work the first day and begins to adjust his ergonomically designed chair. A supervisor comes along and cautions him not to do so, because the chair was adjusted in the factory and is ergonomically correct.

This story presents a perfect example of the fact that even though manufacturers design, develop, and produce products with ergonomic principles in mind, they cannot guarantee that those products will be used correctly.

Organizations spend significant resources (money, people, and time) to develop ergonomics programs to protect their workers. Often an organization has the right equipment to do the job, but that equipment is not being used in the correct way to best perform the job.

Research has shown that many people either do not know how, why, or when to make adjustments to their chairs or simply don't bother to do so. They don't know how to arrange their workstations to accommodate their own size and tasks or to reduce the occurrence of MSDs. Thus they miss out on the health-related benefits of these products purchased for them.

Just changing the physical environment, though, is not always sufficient to reduce work-related injuries, because workers don't always follow the ergonomics guidelines established by the organization for which they work. For example, workers in the U.S. typically are entitled to two 15-minute rest breaks a day in addition to a 30-minute or one-hour lunch break. Many workers, however, find it too disruptive to take advantage of these breaks.

Many of the activities of daily living and working, such as reaching, lifting, bending, sitting, pushing, pulling, typing or keying, using tools, or operating equipment, are often performed incorrectly. That's because people have never been taught how to use their bodies correctly. As a result, their bodies experience stresses that add up over time, wear the body down, cause fatigue, discomfort, pain and – to the unlucky – injury.

What is needed is effective training in ergonomics. But ergonomic training today is, at best, ineffective, or most likely not being done at all.

What training exists is likely being delivered via instruction manuals and videotapes. Instruction manuals often don't consider the fact that people have limited attention spans. Why are there so many VCRs flashing 12:00 in this country? Because people don't want to wade through the instruction manual to learn how to program the clock.

Now for some even better news ...

In many cases, even though the ergonomics training information being provided is very good, the information is not learned because it is not applied.

Think about someone learning how to ride a bicycle. Would they read an instruction manual or watch a video, then hop on the bike and ride off expertly?

Or consider teaching a child how to swim. Just put the video on, show a few swimming strokes, and throw the kid in the water. How effective is that?

And how effective is ergonomics training that is taught only through instruction manuals and videotapes?

Effective ergonomics application can only be achieved through training that enables employees to apply the knowledge they gain through training in their specific work environments. And through training that teaches them – often for the first time – how to use their own bodies in ways that are ergonomically correct.

An athlete is taught through practice to perform amazing physical feats such as performing a back flip on a balance beam that is four inches wide and four feet off the ground and to do it with grace. A four-year-old can be taught how to swim by coaching and supervised practice. And medical students learn how to perform brain surgery through years of study, internships, and residencies where they apply their knowledge.

So then why are employees expected to learn how to make adjustments to their work environment and redesign their jobs through their own intuition or through reading manuals or watching videos?

Don't they also need and deserve the hands-on instruction and practice to learn the skills to work in an ergonomically correct way?

One company, Future Industrial Technologies, Inc. (F.I.T.), based in Santa Barbara, California, has designed ergonomics training programs that show workers how to use ergonomic guidelines to make their work more comfortable. They train individuals to make adjustments to the products available to them and teach them how proper body mechanics and stretching can help them do their jobs better, more efficiently, and in a safer way.

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F.I.T. has created an approach that is defined as “bionomics.” Bionomics combines the teaching of biomechanics, posture, and non-strenuous stretching. The goal is to teach workers in organizations how to prevent the occurrence of physical stress and how to relieve the body of any accumulation of physical stress through proper body management.

Job-specific workshops include customized programs for material handling, construction, trucking, healthcare, police, fire fighters, distribution, etc.

There is an ergonomics workshop designed for people in any work environment where computers and other electronic equipment are used for a large portion of the day. This hands-on workshop consists of ergonomic training, a job-specific stretching routine to eliminate unwanted physical stress, and a practical learning module designed to ensure all participants can adapt any workstation so it is ergonomically correct for their bodies.

Another workshop is geared toward employees who spend a good part of their workday doing strenuous activities such as pushing, pulling, or heavy lifting. This program features safe lifting techniques and work procedures in specialized jobs that involve pushing and pulling techniques.

The success of these training programs is believed to be due to the practical application of the knowledge learned. Trainees apply the information to their own workstations and tasks so that they practice how to perform their job tasks, biomechanically correct, in their own environment, under the supervision of facilitators who coach them in how to do these tasks safely.

These prevention programs are designed to break workers' bad habits and replace them with proper body mechanics and self-management techniques. The goals are to avoid repetitive stress injuries, maximize productivity, and improve the quality of life both on and off the job.

And here's the best news ...

According to OSHA, benefits of implementing an effective ergonomics program will result in:

- 3 million MSDs prevented over 10 years, an average of 300,000 per year
- 27.3 million workers at 1.9 million worksites protected
- \$22,500 savings in direct costs realized for each MSD prevented
- \$9 billion saved each year by U.S. industry

For individual organizations, an effective ergonomics program can:

- Reduce the risk factors for MSDs present in office and non-office work environments
- Keep workers healthy, comfortable, injury-free, and productive on the job
- Increase profitability by reducing the costs of workers' compensation, decreasing lost workdays, lowering turnover, reducing overtime, and decreasing the need to hire new workers to replace those who have been injured
- Increase productivity and efficiency and help organizations use their assets more effectively
- Enhance the value of the furniture and equipment purchased for employees by training them to receive maximum benefit from these assets
- Boost employee morale, since employees see that the organization cares enough about them to help protect them from injuries
- Improve the quality of life for workers at the workplace and at home

New outbreaks of MSDs are already beginning to subside. According to a study released by the General Accounting Office (GAO), employers who implemented ergonomics programs cut MSD costs while increasing employee morale, health, and productivity.

Remember how common neck braces were back in the 1970s? Since then, improved designs of seatbelts and headrests in cars have vastly reduced whiplash injuries.

In the same way, managers and workers can redesign jobs and environments to avoid MSD risks, training programs can teach workers how to adjust their environments and tasks to be ergonomically correct, occupational health specialists will become more skilled and experienced at catching MSDs early, and research will help improve prevention and treatment.

Research shows that when ergonomics programs are applied correctly in the workplace, when jobs are redesigned to reduce risk factors, and when interactive training is used to teach and motivate workers to adjust their environments and perform tasks safely, injuries and illnesses caused by MSDs can be reduced significantly.

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Glossary

Below are definitions for some of the terms used in this document:

Anthropometry: The science of human body dimensions (size, weight, and shape) uses joints and creases on the body as landmarks for measurements. The role of anthropometry in ergonomics is to ensure that the equipment, furniture, and seating fit the people using it ... including smaller and larger workers.

Bionomics: Bionomics combines the teaching of biomechanics, posture, and non-strenuous stretching. The goal is to teach end users in organizations how to prevent the occurrence of physical stress and how to relieve the body of any accumulation of physical stress through proper body management.

CTDs: The term cumulative trauma disorders refers to any of a large category of disorders of the muscles, tendons, or nerves which are caused, precipitated, or aggravated by repeated exertions or movements of the body.

Ergonomic intervention: The process of identifying risk factors associated with job design, technology, or the physical environment, and the development and implementation of counter measures to neutralize or reduce these risks.

Ergonomics: The science of fitting jobs to people, ergonomics encompasses the body of knowledge about physical abilities and limitations as well as other human characteristics that are relevant to job design.

MSD management: A process for assuring that employees with musculoskeletal disorders are provided with methods for reporting symptoms and getting treatment.

MSDs: Musculoskeletal disorders are injuries and illnesses that affect muscles, tendons, nerves, cartilages, ligaments, joints, or spinal discs. Workers suffering from MSDs may experience less strength for gripping, less range of motion, loss of muscle function, and inability to do everyday tasks.

Musculoskeletal system: The muscles, skeleton, and associated soft tissues of the body and their functions.

OSHA: The Occupational Health and Safety Administration, part of the Department of Labor, regulates safety standards for all workplaces in the U.S.

Resources

Below are listed several government agencies and organizations that research and regulate ergonomics in the workplace and publications and websites that post ergonomic information:

Publications

CTD News: a monthly newsletter about current events, MSDs, and ergonomics.
Phone: (800) 341 7874 www.ctdnews.com

Websites

Bureau of Labor Statistics: BLS' Home Page includes injury statistics. www.bls.gov

ErgoWeb offers comprehensive information about ergonomics and ergonomic products. www.ergoweb.com

Office Ergonomics Training by Dr. Christin Grant, Ph.D. BCPE, contains ergonomic information aimed at office workers and practitioners. www.office-ergo.com

Organizations

American Optometric Association (AOA) has developed an AOA Seal of Acceptance standard for glare reduction filters. Phone: (314) 991 4100 www.aoanet.org

Canadian Office Ergonomics Standard (CAN/CSA) Canadian Standards Association International.
Phone: (416) 747 4000 www.csa-international.org

Human Factors and Ergonomics Society writes the ANSI HFES VDT 100 Standards, which provides minimum performance standards for office furniture based on anthropometric data. Phone: (310) 994 1811 www.hfes.org

Illumination Engineering Society (IES) provides lighting guidelines for VDT work environments. Phone: (212) 248 5000 www.iesna.org

Job Accommodation Network (JAN) is a voluntary support group that provides workplace design assistance for workers with limitations.
Phone: (800) 526 7234 www.jan.wvu.edu

National Safety Council (NSC) is a government agency that funds research and produces literature on ADA and other ergonomic issues.
Phone: (630) 285 1211 www.nsc.org

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Government Agencies

Americans with Disabilities Act: (ADA) has an Access Board that is available for phone consultation on interpretation of the ADA law. The board also administrates all documentation surrounding the ADA.

Phone: (800) 872 2253

www.access-board.gov info@access-board.gov

Board of Certification in Professional Ergonomics (BCPE) certifies practicing ergonomists.

Phone: (360) 671 7601 www.bcpe.org

Bureau of Labor Statistics (BLS) collects all statistical data on occupational injuries for the U.S. Department of Labor. Phone:

(202) 606 6179 www.bls.gov

(Check Worker Safety & Health)

National Institute of Occupational Safety and Health (NIOSH) is a government-funded agency that conducts and publishes research and acts as a clearinghouse for occupational safety and health information.

Phone: (800) 356 4674

www.cdc.gov/niosh/homepage.html

Occupational Safety and Health Agency (OSHA) of the U.S. Department of Labor provides published guidelines on MSD prevention, current rule making, and general ergonomic information.

Phone: (202) 693 2246 www.osha.gov

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Universities

Cornell University Ergonomics Website (CU Ergo) includes ergonomic research and ways to improve usability, comfort, performance, and health through better ergo design.

<http://ergo.human.cornell.edu>

UCSF/UCB Ergonomics Program: University of California San Francisco/University of California Berkeley's Ergonomics Program. www.me.berkeley.edu/ergo

University of Michigan Center for Ergonomics

Phone: (734) 763 2243

www.engin.umich.edu/dept/ioe/C4E

Other

Future Industrial Technologies, Inc. (F.I.T.) combines ergonomics, stress reduction techniques, and practical application to help workers avoid musculoskeletal disorders and discomfort throughout the workday. Please contact your local Herman Miller dealer for specific information about F.I.T.