

TerranearPMC Safety Share

Week of September 12, 2011 – Ergonomics

Ergonomics is the science of fitting workplace conditions and job demands to the capabilities of the working population. Effective and successful "fits" assure high productivity, avoidance of illness and injury risks, and increased satisfaction among the workforce. Common examples of ergonomic risk factors are found in jobs requiring repetitive, forceful, or prolonged exertions of the hands; frequent or heavy lifting, pushing, pulling, or carrying of heavy objects; and prolonged awkward postures. Vibration and cold may add risk to these work conditions. Jobs or working conditions presenting multiple risk factors will have a higher probability of causing a musculoskeletal problem. The level of risk depends on the intensity, frequency, and duration of the exposure to these conditions and the individuals' capacity to meet the force of other job demands that might be involved.

The term *ergonomics* is derived from the ancient Greek words of *ergon*, meaning "work", and *nomos*, meaning "natural laws." It first entered the modern lexicon in 1857 when the Polish biologist, Wojciech Jastrzębowski used the word in the article, "The Outline of Ergonomics, i.e. Science of Work, Based on the Truths Taken from the Natural Science." (Indeed a mouthful – just be happy I didn't quote this title as written in his native language!).

The foundations of the science of ergonomics appear to have been laid within the context of the culture of Ancient Greece (hence the origin of the word). A good deal of evidence indicates that Hellenic civilization in the 5th century BC used ergonomic principles in the design of their tools, jobs, and workplaces. One outstanding example of this can be found in the description Hippocrates, the father of modern medicine, where he described how a surgeon's workplace should be designed and how the tools he uses should be arranged. It is also true that archaeological records of the early Egyptians Dynasties made tools, household equipment, among others that illustrated ergonomic principles.

A term that is frequently used to describe the human condition as a result of poor ergonomic practices is musculoskeletal disorders or MSDs. MSDs were recognized as having occupational etiologic factors (meaning that occupational factors were recognized as causing a disease – in this case MSDs) as early as the beginning of the 18th century. However, it was not until the 1970's that occupational factors were examined using epidemiologic methods, and the work-relatedness of these conditions began appearing regularly in the international scientific literature. Since then the literature has increased dramatically; more than six thousand scientific articles addressing ergonomics in the workplace have been published. Yet, the relationship between MSDs and work-related factors remains the subject of considerable debate. Therefore, it is interesting to point out, that OSHA has not promulgated an ergonomic standard and therefore, while organizations such as the National Institute for Occupational Safety and Health (NIOSH) have numerous publications on this subject, the closest federal regulation that may protect workers from ergonomic factors is the OSHA *General Duty Clause*, that states:

“Each employer shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees”

So what is available to all of us in the work force? As mentioned earlier, NIOSH has a number of publications that focus on the various occupations that have been recognized as having a strong association with MSDs. Such publications include guidelines for manual lifting as well as office ergonomics and can be found at: <http://www.cdc.gov/niosh/topics/ergonomics/>.

One of the most prevalent topics of concern today is office ergonomics – especially for those of us that work all day at an office work station, in front of the computer. Here are a few tips:

- Make sure the top of the computer screen is just below your eye level so you are tilting your head in a very slight downward level
- Your head and neck should be in balance and in line with your torso.
- Your elbows should be close to your body while being supported (such as an arm rest)
- Your lower back (the lower five vertebrates referred to the lumbar) needs to be supported to decrease pressure (lower back straight and leaning against a back rest). The combination which minimizes pressure on the lower back is having a backrest inclination of 120 degrees and a lumbar support a five centimeters. The 120 degree inclination means the angle between the seat and the back rest should be 120 degrees (not 90 degrees as many people think). The lumbar support of 5 centimeters means that the chair back rest supports the lumbar by sticking out 5 centimeters in the lower back area.
- The waist and hands should be in-line with the forearm (i.e. within the same plane)
- Always have adequate room for the keyboard and the mouse.
- Both feet should be flat on the floor.
- It is also import to take frequent breaks throughout the day, such as stretching for five minutes every hour.

Many ergonomic experts have professed that the best way to reduce pressure on the back is to be in a standing position (actually this is often referred to as the bar stance as people standing at a bar typically have one foot resting on a foot rest located about six inches from the ground). However, while standing may offer ergonomic benefits, there are times you will need to sit.

The above pointers are just a few of the many things we can all do to ensure our own well-being (how many of us can actually say we follow these practices at our own work station?). However, if you feel that you need a fresh pair of eyes to examine your work station and offer some advice to help you in your efforts to maintain a healthful work environment, never hesitate to get some assistance either from your Safety and Health Professional or immediate supervisor. It's the best place to start!

Nobody gets to live life backward. Look ahead, that is where your future lies. - Ann Landers