



STAND-SIT WORKSTATIONS

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An Alternative to Sedentary Work

A computer desk and chair have become the prevalent work environment for the American working population. Compared to the factors involved in a blue collar job, office employees are believed to be exposed to virtually no factors associated with occupational illnesses or disease; this, of course, is a common misconception. Computer workstations allow employees to be productive in one place, but work and production demands expose employees to job tasks that puts them at risk of musculoskeletal disorders (MSDs) and/or cumulative trauma disorders (CTDs). Ergonomics, the study of work to prevent and control injury and illness by reducing worker fatigue and discomfort while maximizing overall quality and productivity, focuses on identifying factors such as static postures, repetitive motions, contact stress or pressure, awkward postures, vibrations and extreme hot or cold temperatures to provide necessary actions to eliminate or reduce the exposures. As the amount of work performed at a computer desk increased, the need for office ergonomics surfaced to address the specific problems that became apparent from prolonged sitting tasks. Currently, office ergonomics has evolved from focusing on preventing the factors that lead to fatigue and injury to the gradual movement towards a sit-stand work station.

This paper provides an overview of potential physical disorders related to prolonged sitting, potential health consequences of sedentary work, and stand-sit workstation costs and alternatives,

Physical Disorders Related to Prolonged Sitting

Employees are an essential and valuable part of a company and it is especially costly when someone becomes injured or ill and cannot make it to work. Therefore, companies who have a majority of computer- and office-related job tasks must take into the consideration the factors involved in prolonged sitting and improper postures that may lead to work-related musculoskeletal

disorders. There are a series of problems that may occur when a person is required to sit for long periods of time without adequate breaks or time allotted to perform tasks in different postures. Prolonged sitting postures not only fatigue the worker with static postures, which can lead to injury, but the great amount of time spent in a sedentary state increases the risk of developing chronic diseases.

Occupational low back pain (LBP) has great effects on both the employee and the employer. Many studies have shown that great mechanical loads on the back can lead to LBP and injury. Not only are heavy lifting, awkward postures, and improper lifting technique detrimental to worker's back, static or prolonged postures are also risk factors. LBP is found in sedentary occupations such as office workers. The prolonged seated posture leads to an accumulation of metabolites, such as lactic acid, and results in fatigue and discomfort. Disk degeneration and disk herniation could also occur from the continuous seated postures since sitting inhibits the spine from maintaining its natural (or neutral) S-shape posture (Pope, 2002).

Deep vein thrombosis, known as DVT, occurs when blood in the legs clots and forms an embolism, which is a blockage in narrow veins. It is estimated by the American Heart Association that one in





every one thousand American develops DVT each year (Benden, 2008). Symptoms of DVT include leg pain and tenderness in the calf muscles; others may experience swelling or change in color of one leg to purple or blue. A study conducted in New Zealand found that hospitalizations due to blood clots are far more common in seated office workers than long-distance air travelers. Over thirty-three percent of all hospital DVT cases in New Zealand resulted from being seated at work for long periods of time (Benden, 2008). This condition is just one of many complications that can occur from sitting for long periods of time.

The mechanization and automation of work today has further increased jobs that require workers to be seated for long periods of time, which could cause adverse effects to both the employee and the employer due to this prolonged posture. Sitting requires less muscle activity and it is a frequent misconception that people who work in such position are excluded from the possibility of injury usually associated with physically demanding jobs. People who work at desks such as clerks and high-computer use occupations are also prone to back pain or injury, muscle tenderness, and stiffness.

Chronic Health Consequences of Sedentary Work

When an employee is in good health, an employee feels better

about themselves and they are more productive. Increase in productivity helps their credibility and it also benefits their employer. Millions of Americans commute to work, sit at an eight hour work day desk job, commute back home, and likely sit on the couch and watch television after a long day at work. Today, society also lives in an automated sense of lifestyle, which further increased prolonged postures both on and off the job (Fields, 2010). Americans now have direct deposit, email, and on-line shopping. All the things that have now been simplified have greatly reduced the time society had available to participate in simple physical activity such as a brisk walk around the mall while shopping or walking to another office to discuss an issue with another coworker.

In 2010, the American Cancer Society published a study in the American Journal of Epidemiology that followed 123,216 individuals (69,776 women and 53,440 men) from 1993-2006 in an effort to examine the effect of leisure time sitting regardless of activity level (Juststand.org, 2010). The subjects recruited were disease free prior to the initiation of the study. According to the study, women who sat over six hours a day were 37 percent more likely to die during the time period studied than those who sat less than three hours a day. In addition, men who sat over six

hours a day were 18 percent more likely to die than those who stood less than that amount. An important point in these studies was the fact that regardless of the amount of physical activity a person participated in during this study, the time spent sitting affected their health.

Another study in the British Journal of Sports Medicine, focused on the issue of the amount of time adults spent during the time frame when they were not exercising (Owen, 2008). It is widely known that adults are recommended to participate in at least 30 minutes of daily physical activity. According to this study (Owen, 2008), evidence has shown that high volumes of sedentary activity regardless the amount of physical activity is related to the development of common chronic diseases. Even though adults participate in 30 minutes of daily physical activity, evidence shows that adults who participate in prolonged periods of sitting have an increased adverse metabolic and health effects. Other statistics show adults, on average, spend about 9.3 hours a day in sedentary activity, 6.5 hours a day in light intensity physical activity, and 0.7 hours a day in moderate to vigorous physical activity. Considering the amount of evidence available stating the amount time spent in sedentary activity, one could suggest some alterations in the work place to promote healthier living.

A study in the American Journal of Preventive Medicine, (van

Ufflen, 2010), focuses on a systematic review on the health risks and occupational sitting. In Australia and the United States, about two-thirds of adults are employed in occupations that require prolonged sitting, 83 percent of the jobs are full-time. Specifically in the United States, a typical American spends an average of 9.2 hours working per day on a weekday, which most of the time is spent sitting. Based on the amount required to sit at the job and the amount of hours working on average, occupational sitting is likely to be the largest contributor to overall daily sitting time.

According to a survey by Ergotron (Ergotron, 2010), a Minnesota-based manufacturer of ergonomic computer mounting and mobility products, two out of three U.S. office workers wish their employers offered them desks that could be adjusted to work seated or standing. About 60 percent of the survey participants believed they could be more productive if they were given the chance to work on their feet. Findings of the survey also address the issue of employees seeking medical help. About a quarter of the employees had to seek medical help to alleviate the discomfort resulting from the working conditions. In addition, the more hours spent in front of the computer, the more times that employee sought medical help to alleviate pain and discomfort.

Stand-Sit Workstation Costs and Alternatives

There are many manufacturers and vendors that offer stand and sit workstations. Of course, the amount of money available to spend on accessories to redesign the employees' workstations depends on the company's available budget for such expenditures. Possible workstation equipment can range from \$400 or less to over \$1,000 (Ergotron, 2010; Benden, 2008). There has been a steady increase in back pain related health-care costs for America. In a study in the Journal of the American Medical Association (Weiner, 2002), it was estimated that Americans spent \$85.9 billion dollars looking for back and neck pain relief through surgery, MRI's, doctor's visits, x-rays, and medications. Low back pain is also responsible for more than 93 million lost work days and 25% of all workers' compensation claims, according to the American Academy of Pain Management. Thus, adapting a healthier work environment has considerable economic benefits.

If the budget or funding is not available for purchasing a new workstation, there are some other alternatives that can be utilized to convert the old sitting workstation into a sit-stand workstation. Workstation desks can be adjusted to the needed height of 40 to 42 inches with cinder blocks, PVC pipes, lumber, or other alternative. Forty (40) to forty-two (42) inches is a convenient height because

it allows ninety percent of the adult population to work comfortably while standing. Many existing office furniture can be adjusted up to meet certain heights. If concerns arise regarding the adjustability of existing office furniture, the manufacturer can supply ideas of how to adjust the equipment to a suitable height. The keyboard tray should be adjustable to be raised six inches above the working surface and six inches below the working surface to accommodate the taller and shorter individuals. The office chair should be converted into or purchased to a stool. The seated work should range between six inches below to even with the work surface. When purchasing or converting the office chair, stability must be taken into consideration and meet the General Purpose Office Chair Tests ANSI/BIFMA 5.1-2002. Stability requirements are tested at the height of 21 inches from the floor to the seat pan, so new workstation chairs should meet requirements at 26 to 31 inches. Other things to consider while making a standing and sitting workstation is a foot rest. Lack of foot rests often prevents the worker to adapt to the new workstation. A foot rest should be at a height of six inches. A platform while sitting on the office stool should be at a height of ten inches. The platform will serve as floor support for the office worker's feet. Such platforms can be made by using a crate or box if the office stool does not have a platform already installed. Make sure all other office ergonomic considerations, such as keyboard posture, monitor height, leg room, and other, are followed to ensure safe and healthy workspace if no stand and sit workstations are possible.

If any alterations to the office are not possible, other changes to the way daily work is carried out could be made. Any calls that are made or taken throughout the day could be performed while standing up if no typing is necessary during the task.





Thus, breaks are taken from sitting for a good amount of the workday. Printers could also be located at a further distance to allow workers to walk to pick up printouts. Also, group meetings could be organized to be at a designated location to allow standing or at designated walking trails if possible. Workers could also be encouraged to stand at meetings and potentially start a healthy movement towards active rest from sedentary work. Finally, adequately stretched muscles have been shown to resist stress and increase the range of motion and flexibility, thus, helps prevent MSDs and CTDs. A workplace stretching program should be considered. Stretching is encouraged to be performed before starting the workday, after sitting or standing for long periods, and at various times throughout the workday.

Conclusion

Common thoughts on standing while working are directed towards the amount of fatigue involved in standing jobs. These biased conclusions discourage employers or employees to adapt to a stand and sit workstation. Reasons behind these statements are from information and studies from the types of jobs that require full-time standing tasks. During a job task that requires long periods of standing, a short period of sitting can be protective in preventing foot discomfort. A sit and stand workstation has many benefits to an employee and the employer. The alternating postures prevent fatigue and injury and provide the worker with a dynamic work environment that promotes productivity. Alternating postures eliminates the monotony related to sitting at the computer for most of the workday. The ability to change from sitting to standing postures gives the employee a sense of change, a partaking in healthy daily living, and makes the job seem less monotonous.

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