

A Neutral Posture White Paper



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Reduce Healthcare Costs and Improve Worker Productivity

A summary of *Could You Stand to Lose?*, Mark E. Benden, PhD, CPE's research on weight loss at work and the simple solutions that can help lower healthcare costs and improve productivity.

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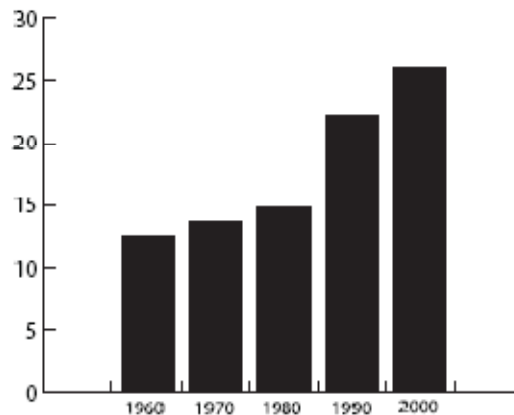
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Introduction

Health care costs in the United States are rapidly rising, and the costs employers incur from these increases are growing as well. When compared to their normal weight peers, obese workers cost companies ten times the number of lost work days and health care dollars. This, along with the staggering fact that over 400,000 people died in the U.S. in 2006 from obesity related disease, led Mark E. Benden, PhD, CPE, to develop a new way of thinking to combat this epidemic with the simple addition of increasing movement in the average workday. By adding only two-and-a-half hours of standing to an employee's workday, 350 extra calories are burned per day, resulting in a 20 pound weight loss in one year.

The Overweight Workplace

One of the largest cost reduction strategies facing companies today is managing the increasing cost of overweight employees. In 2006, sixty-six percent of all Americans were overweight or obese. Compared to workers of average or normal weight, obese workers spend twenty percent more time sitting at their workstation. Does the obesity rate in America come from working in sedentary, seated jobs? Or are these jobs preferred since the majority of Americans are obese or overweight? Obesity is currently measured by BMI, or Body Mass Index, determined by dividing weight in kilograms by height in meters squared. Overweight is defined as a BMI of 25 to 29.9 kg/m² and obesity is defined as a BMI of 30kg/m².



PERCENTAGE OF OBESE U.S. ADULTS

Computers are used by more than twenty-five percent of the workforce for more than half of each work day. Deep Vein Thrombosis (DVT), caused from sitting for long periods of time, is far more common in seated office workers than the more commonly publicized long-distance air travel cases. According to a study by the University of North Carolina, severely obese workers are more likely to sustain workplace injuries than workers of average size. It was also found that obese workers lost thirteen more days of work due to work-related injuries and illnesses than their non-obese counterparts. The incurred medical costs were seven times higher than average workplace-related claims as well, and obese workers are more than twice as likely to file a work-related injury claim. This results in \$13 billion per year of obesity related costs to U.S. businesses.

According to research by MetLife, the CDC and the American College of Cardiology, three key conditions linked to obesity – diabetes, arthritis and heart disease – cost employers more than \$200 billion annually in medical care and lost productivity. Obese workers cost employers up to \$2,000 more per employee than normal weight employees. Obesity and related disease costs now drive roughly 30 percent of total healthcare expenditures. Over half the growth of healthcare spending was attributable to increased prevalence of disease rather than an increase in how much it cost to treat each person.

**NORMAL WEIGHT EMPLOYEES –
ARE THEY THE NEW MINORITY?**

<u>YEAR</u>	<u>PERCENTAGE OF WORKFORCE IN NORMAL BMI RANGE</u>
1987	52%
2001	39%
2010	17%

*Source: Thorpe, K. et al Health Affairs Web Exclusive
W4-480; 10-20-04*

In addition to the negative economic effects obesity has on corporations, the effects of obesity and related diseases on the individual are also shocking. As an independent risk factor, obesity carries a six-fold increase in mortality rate. (JAMA, Neville, 9-2) More than half of the 400,000 deaths each year attributed to obesity were a direct result of complications from diabetes. By reducing overall weight, not only does the risk of diabetes decrease, but many other overall health benefits are incurred.

Weight Loss Benefits

1. Decreased cardiovascular risk
2. Decreased glucose and insulin levels
3. Decreased blood pressure
4. Decreased LDL and triglycerides, increased HDL
5. Decrease in sleep apnea severity
6. Reduced symptoms of degenerative joint disease
7. Increased longevity – Adults who were obese at age 40 years lived 6-7 years less than their normal weight counterparts.

There is currently a tremendous opportunity to turn around the negative health outcomes for a large portion of the workforce, and it must begin by dealing with the underlying causes of the obesity boom in the U.S.

Workplace Design

“The sedentary workplace (is) a potentially hostile environment in terms of overweight [workers] and obesity,” according to a study presented in the August 2005 issue of the *American Journal of Preventative Medicine*. Due to the increase in time office workers spend seated at their desk, the industry’s response has been to build a better chair. Chairs were developed to minimize pressure applied to the body on the seat, back and arms of the chair by allowing the trunk-thigh angle of the body to be in the ideal neutral position. While reducing the worker’s risk for repetitive trauma, the industry increased the probability that the worker could comfortably stay in one spot for long periods of time.

Very few companies recognized the need for people to move more in the office as a healthy way to reduce fatigue. In the past, standing has been poorly received due to the injury and fatigue that come along with jobs that require full-time standing without the option to sit down. The human body is simply not equipped for static postures over sustained periods of time, but designed for motion. According to Dr. Jerome J. Congleton, a leading ergonomist at Texas A&M University, “your best seated position is your next one.” Dr. Congleton’s research includes the neutral body position – the position the human body assumes in the absence of gravity – which is the body’s position of maximum strength, ideally facilitating respiration and circulation.

In order to combat the ever increasing healthcare crisis in the next decade, we must drastically shift the furniture design paradigm that states that seated office work is the standard. One proposed idea is Non Exercise Activity Thermogenesis (NEAT), which encourages the reprogramming of workers’ daily routines to produce desired health outcomes. According to Dr. James Levine of the Mayo Clinic, “NEAT is the energy expenditure of all physical activities other than volitional sporting-like exercises that render us vibrant, unique and independent beings such as working, playing and dancing. To reverse obesity, we need to develop individual strategies to promote standing and ambulating time by 2.5 hours per day and re-engineer our work, school and home environments to render active living the option of choice.”

Since most people struggle with adding exercise to their daily routines, it is much more realistic to build in extra calorie burning activities like standing at your computer desk for a portion of your work day. Standing burns 40 percent more calories than sitting, which translates to weight loss for a 175 pound person in the following way:

- Standing for 2.5 hours each day would result in an extra energy expenditure of 350 calories per day.
- It takes 3,500 calories to equal 1 pound of weight loss
- Ten days of 350 calories per day equal 1 pound of weight loss
- There are 250 working days in a year or the potential for 20-25 pounds of weight loss by adopting this method of working.

Though calories burned per hour fluctuate slightly depending on weight, the ratios and percentages hold.

Initially, providing the option to stand at one’s workstation included height adjustable desks which could be moved up and down with springs, pneumatic cylinders, electric motors and/or counterbalances. Workers were given a standard desk chair and given the ability to move their desk up and down as they felt like it. However, issues with these traditional sit/stand workstations, including the need to move it down to seated level when guests came into the office, not having a place for the users feet to rest while standing to reduce fatigue, and just not having the time or taking the effort involved in rearranging the desk for standing work, minimized their actual use among those that

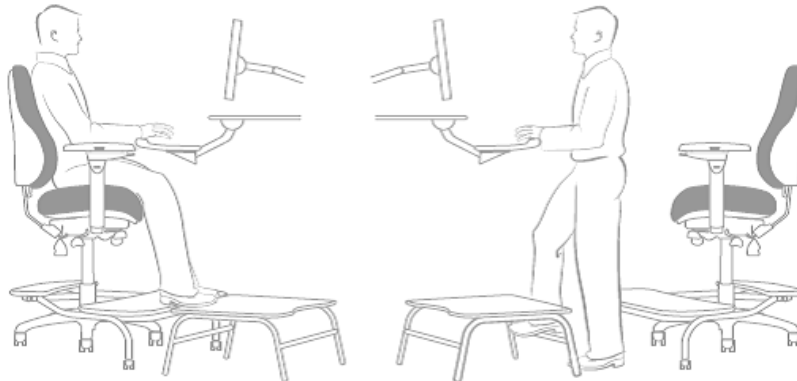
had the capabilities. There was a failure to design the entire station and surrounding office as a standing station with the option to sit.

The underlying problem with initial workstation designs is that even though they allow for standing, they are still biased towards seated work. This initial paradigm must be changed from the assumption of seated workers to one of upright workers standing at workstations designed to allow intermittent sitting.

Dr. Levine advocates bringing exercise into the workplace and has his personal desk designed to allow him to stand and walk slowly on a treadmill as he reads e-mail, takes calls and works on his computer. While the treadmill desk could help workers become healthier, the downsides are the high cost, constraints of office space, added noise and potential for disruption to office work flow.

Implementation

In order to create a workstation that fits this new model of workplace design, the following elements must be put in place:



Taller Desk

The standing workstation should be positioned at 40", which will allow ninety percent of the healthy adult population to work comfortably while standing. This height also allows one fixed height desk to cover the standard range needed for the 5th percentile female to the 95th percentile male. Standard keyboard trays put the keyboard 6" above and 6" below the desktop, accommodating the range needed to fit the small to tall while standing.

There are currently dozens of solutions for a fixed height standing desk. Most system furniture has the capability to be raised to 40" by hanging the work surfaces higher on the panels. Many workstations can be raised with blocks, lumber and even PVC pipe

that can slide over legs to extend the height of the workstation, all of which are available at your local hardware store.

Seating

A quality ergonomic chair converted to or purchased at stool-height is worth the investment. Since workers will still spend over half their day seated, it is imperative that the same guidelines for quality, adjustability and comfort that have always been used when selecting ergonomic seating are used. Seating should also include stability tests in accordance with ANSI/BIFMA 5.1-2002 in the stool height configuration. The seat height should be able to vary between 26" and 31". The stool should also include a foot support such as a foot ring or platform. Platforms like Neutral Posture's NeXtep® and N-step™ are found to be much more comfortable to use over long periods of time and also make it safer to enter and exit the stool. A footring should be nylon to provide traction and no less than 20" in diameter.

Footrails and Foot Platforms

One of the most critical components of this system is a rail or platform approximately 6" off the floor that allows the user to place one leg up while standing and thereby relieves lumbar spine loading and muscle fatigue. Shifting your weight is a natural way to relieve standing stress. Standing for any amount of time without a foot support is unrealistic and the main reason that most adjustable desks fail to catch on. While seated, a 10" high platform provides a "false floor" and creates a standing station that allows for comfortable seated work. The platform's main purpose is to allow the user to vary their posture and place their feet and legs out in front of them.

Monitors

With the fixed height standing workstation, the monitor height won't need to change much to vary from seated height to standing height. To add flexibility of depth, tilt and height, a flat panel monitor arm is the best way to achieve the monitor height needed.

Other elements to take into consideration when designing and using the workstation include supportive shoes and padded carpet floors, which minimize stress on the body while standing.

Conference Rooms can also be designed to utilize the fixed height standing workstation. By allowing workers to stand, meetings will be more dynamic, creative and collaborative. Better decisions will be made due to increased blood flow to the brain and the overall alertness of the team. Standing tables should have a footrail of 2" to 3" in diameter at 6" to 8" off the floor, set back from the edge of the table about 6". Ideally, an additional foot shelf at 10" from the floor would allow the most flexibility for standing and sitting users.

When implementing these designs, employers must be conscious to comply with the American's with Disabilities Act. The easiest way to ensure this is to provide a certain percentage of workstations that are not fixed at 40" but adjustable back down to

standard seating levels. These stations can be used just as easily at standing height with a stool as by an individual in a wheelchair. In conference rooms, both a traditional and a standing height conference room should be available for use.

Once the standing workstation is implemented, there are many simple methods that can help monitor your progress. Using a BodyBugg™ or similar device to monitor calorie burn or simply monitoring weight loss should suffice for most users.

Summary

In the face of a growing economic obesity epidemic, incorporating simple changes into seated workers' daily lives could bring drastic reductions in the overall costs employers incur, while providing immense health benefits to the employee. To meet these challenges, employers need to implement the following best practices:

- Encourage movement throughout the day by providing both standing and sitting options for employees.
- Install standing height workstations that allow for seated breaks.
- Provide high quality ergonomic chairs that meet guidelines for quality, adjustability and comfort for workers to use during breaks from standing.

As an increasing number of forward-thinking designers and space planners enter the field, and healthcare costs continue to rise, we will begin to see more products that promote standing and movement for a more healthful and productive workforce.



Resources

Benden, Mark E., *Could You Stand to Lose*, Second Edition, Trinity River Publishing, 2008.

About Neutral Posture

Neutral Posture, the only woman-owned seating manufacturer, is a certified Women's Business Enterprise (WBE) and one of the top diversity suppliers for the United States government and Fortune 500 companies worldwide. The company's unique product line provides a wide variety of adjustable office and industrial seating solutions, such as multi-adjustment task seating, executive and conference seating, lab and healthcare environment solutions, and quality ergonomic office accessories. The company provides a full set of solutions to fit all sizes of the seated workforce, from petite to big and tall. Neutral Posture's unique combination of outstanding service, innovative products and industry expertise offers solid benefits to all users. More information can be found at www.neutralposture.com.

About Mark E. Benden

Mark E. Benden, PhD, CPE, has been the leader of MEB Ergonomic and Design Consulting for over 20 years and is currently a professor at the Texas A&M Health Science Center School of Rural Public Health. He is a Certified Professional Ergonomist and Biomedical Engineer with years of experience designing offices, tools and tasks for productivity gains, quality improvements, and reduced risk of injury to employees in hundreds of different job types all over the world. In addition to holding fifteen U.S. patents for his award-winning designs, he has written and lectured for years on the need to design environments and products with a human-centric approach. For more information on the research of Dr. Benden and his book, *Could You Stand to Lose*, visit www.markbenden.com.

For more information on Neutral Posture and assistance implementing standing workstations, please contact 979-778-0502, or email customerservice@neutralposture.com