

# A Step-by-Step Look

Walkstation Research



The Walkstation is a breakthrough product, not only in terms of engineering and design but also in the amount of research which led to its development. This paper is a summary of the research that led to the development of the Walkstation. It also offers summary briefs on research done since its launch by multiple customers who have graciously shared their results.

The Walkstation was developed with the consulting assistance of Dr. James A. Levine, of Mayo Clinic. The Walkstation and the Details FitWork™ category of products are significantly influenced by his extensive research in the field of non-exercise activity thermogenesis (N.E.A.T.), the energy expended during everyday activity.

A Steelcase Company

details®

## The Initial Study: N.E.A.T.™

Dr Levine's clinical study spanned 10 years. The research included following 20 individuals who went about their normal work, recreation, rest and life routines. The results were published in the journal *Science* in January 2005.

Highlights of the study:

- The most detailed and data-rich study on obesity ever
- 150 million lines of data were downloaded from the data-loggers and analyzed
- Every meal had to be taken at the hospital, without exception
- Utilized biomedical team at Mayo Clinic of 150 people, ranging from endocrinologists, dieticians to specialists to conduct analyses of data
- A dedicated kitchen staff to cook 20,000 meals over the test period, starting at 5 a.m. each day—without skipping a beat, food group or strange hankering
- Custom-made data-logging undergarments that all participants wore 24 hours a day, exchanging a new pair every morning at the hospital at breakfast

What was learned: NEAT could be a critical component in how we maintain our body weight and/or develop obesity or lose weight. Even trivial physical activities increase metabolic rate substantially. It is the cumulative impact of increasing the metabolic rate through added daily movement that can help to interrupt or reverse rising weight and obesity statistics and their associated health risks.

*Nonexercise activity thermogenesis (NEAT): environment and biology; Science. January, 2005*

## An Office That Moves Together Loses Together

Beginning in late 2007, Dr. Levine continued his research of environment-changing innovations with a real-life study in an office that was re-engineered for physical activity. Dr. Levine's team of researchers prepared the office by:

- Adding Walkstations and walking tracks
- Replacing chairs and traditional desk seating
- Encouraging workers to conduct walking meetings
- Replacing traditional phones with mobile sets
- Introducing games to the workplace
- Providing high-tech activity monitors
- Teaching workers about nutrition

Of the 45 employees who volunteered for the study, 18 were studied for weight loss and other changes.

The results for those 18 were as follows:

- Lost an average of 8.8 pounds, 90 percent of which was fat
- Decreased their triglyceride levels an average of 37 percent
- The nine participants with specific weight loss desires lost an average of 15.4 lbs.
- Company officials reported no productivity loss and the companies' highest-ever monthly revenue in January 2008—the study's midpoint

*For more about this study see: "Walkstation Customer Experience" <http://details-worktools.com/library/>  
And Mayo Clinic "Office of the Future" Environment Study; <http://www.mayoclinic.org/news2008-rst/4924.html>*

## Can People Walk and Work at the Same Time?

At Miami University, in Oxford, Ohio, researchers performed a range of tests to determine how the Walkstation would affect the daily office routine.

Specifically they wanted to measure whether simple motor skills (e.g., finger tap test (FT)), cognitive function tasks (e.g., Impact (CF)), and typing skills (e.g., Mavis Beacon Typing Test for Beginners (T)) differed when performed by 24 individuals while seated versus on a Walkstation moving at 1.5 mph.

What they concluded: Analysis of the data suggests that performance of a simple motor task, a battery of cognitive function tasks, and a standardized typing test were not significantly affected while walking as compared to sitting. Walking is associated with an increase in heart rate and oxygen uptake, both of which increase in caloric expenditure.

*PERFORMANCE OF MOTOR AND COGNITIVE FUNCTION TASKS ARE SIMILAR DURING WALKING AND SITTING; Authors: Kelsie Bernholtz, Ryan Gallagher, Brennan McGill, Lindsay Cary, & Randal Claytor; Department of Kinesiology and Health Miami University, Oxford, OH 45056*

*THE EFFECT OF USING AN ACTIVE WORKSTATION ON COGNITIVE FUNCTION AND MOTOR SKILL; Authors: C.M. Ohlinger, T.S. Horn, R.H. Cox; Miami University, Oxford, OH*

## What About Talking While You Walk?

Miami University also compared speech quality variations of 30 adults while sitting, standing and walking. Heart rate and oxygen uptake were tracked as each individual read silently, aloud or engaged in spontaneous conversations sitting, standing and walking at 1 mile per hour. Quality of speech was assessed by speech experts blind to the variable conditions.

The findings: The study found that the active workstation significantly increased metabolic activity without compromising important tasks typical in a work setting, specifically speaking. The outcomes support the utility of using active work stations to significantly increase physical activity in the work environment and thereby enhancing health without breathless or altered speech patterns.

*ASSESSMENT OF CARDIOVASCULAR RESPONSE AND METABOLIC COST OF SPEAKING WHILE USING AN ACTIVE WORKSTATION. Authors: Guth, R.H. Cox, C. Reed, H. Alessio, FACSM, S. Brehm, B. Kellems, L. Siekemeyer and C.M. Ohlinger. Miami University, Oxford, OH*

## Surprising Results About Body Composition

Another Miami study also looked at how Walkstation use influenced body composition and blood lipids. Focusing on bodyweight changes as the only measure of the effectiveness of Walkstation implementation may miss significant changes in the amount body fat or lean body mass (muscle) gained or lost during a year's time.

The results showed that the workers using the Walkstation over a 12 month period experienced some reduction in body weight, but more importantly lost fat weight while maintaining and even increasing their percentage of lean tissue (muscle mass) compared to the workers without access to the Walkstations. The alterations in body composition (fat loss and lean gained) and reduction in waist circumference reflected an improvement in health profile even more than the subjects' weight loss.

- Total cholesterol levels were also significantly decreased (-14%) while the controls did not change.
- In addition, physical activity levels at home were not reduced with the addition of the Walkstation, which supports the feasibility of the Walkstation to increase total physical activity levels in sedentary individuals.

*WORK SITE INTERVENTION WITH ACTIVE WORKSTATIONS (WALKSTATION): EFFECTS ON METABOLIC FITNESS VARIABLES AT FIRST FOLLOW-UP. Authors Ronald H. Cox, Christina Ohlinger, and Amanda Zylstra. Miami University*

## Evaluating Performance of Typical Office tasks While Walking

A decrement in typing speed while walking is to be expected, as an individual is attempting two different tasks simultaneously. However, questions remained about how much of a decrement occurs, the reasons for the decrease and whether practice can return performance levels back to normal. Another group of Miami University researchers focused on the Walkstation's impact on 19 proficient typists (greater than 60wpm). A biomechanical analysis of walking gait was performed while solely walking and walking while typing. Initially typing performance was decreased 17% and biomechanics of walking were altered.

After three 15 min practice sessions performed over the course of 5 days:

- Typing speed and accuracy were regained and biomechanics normalized
- The change in biomechanics of walking while typing in the initial exposure to the Walkstation may contribute to potential users perceiving their performance decrement being more severe than it actually is and hampering worker acceptance

These results indicate this potential obstacle to user acceptance can be overcome in a brief period of time.

*THE EFFECTS OF ACTIVE WORKSTATION USE ON TYPING SPEED AND WALKING MECHANICS*  
Rachel Funk, Mark Walsh, Christina M. Ohlinger, Thelma Horn and Ronald H. Cox1.  
Departments of Kinesiology and Health, Miami University, Oxford OH

Submission to: *Human Factors: The Journal of the Human Factors and Ergonomic Society*

## More Coming From Miami University

In September of 2010 Miami University began a one year study with workers in the Information and Technology services of the university. These include system analysts and programmers, occupations which demand high levels of cognitive function and dexterity. A primary focus of the study involves assessments of job productivity (e.g. code written) in addition to measurements of body composition, blood pressure, blood lipids and physical activity during leisure time.

## Mutual of Omaha: 49 day Study of Walkstation Users

At the corporate offices of Mutual of Omaha, 11 participants were followed for 49 days as they incorporated Walkstation time into their daily activities. Participants' weight and cholesterol levels were established at the start of the study period as were those of a control group who would not be using Walkstations.

Cumulatively, the user group walked a total of 1,154 total miles at an average speed of 1.53 mph.

Below are the study end data comparisons of the Walkstation and control groups:

- Walkstation users lost an average of 3.4 lbs. (-1.6%) as compared to an average weight gain of 2.0 lbs. (+1.2 %) for the control group
- Walkstation users experienced an average cholesterol increase of 6.3 points as opposed to the average gain of 9.1 points for the control group
- Walkstation users maintained or increased productivity levels throughout the test period



## Denver Water's Pilot Programs Show Significant Returns on Walking

At Denver Water 4 employees with the Customer Care call center volunteered for a Walkstation six-month pilot program. The participants agreed to walk while working, for two hours per day. Their reasons were simple, "Our job is real sedentary, we sit all day," says Debbie O'Neill. "A lot of people can't get to the gym, before or after work."

The four participants recorded individual weight losses between two pounds and 80 pounds.

The success of the first group spawned a second group of Customer Care representatives to take up the challenge for a second trial lasting four months.

"I love it," said Kelly Jackson. "I have more energy when I get home in the evening. I feel more motivated."

As in the first group, these workers also experienced weight loss during the testing period—they dropped between two pounds and 10 pounds.

Highlights of the results for both groups at Denver Water:

- Averaged 36.5 miles of walking while working each month
- Averaged 21 hours of walking while working each month
- Burned an average of 4790 calories each month

To see video of Denver Water go to: <http://details-worktools.com/library/KDVR> Fox News

## Radiologists Pilot Walkstations for CT Image Interpretation.

Two separate investigations of the feasibility of adding walking to the daily image reading routines for radiologist to determine the impact on accuracy and what, if any, would be the physiological impacts for radiologists.

The studies were conducted by radiologists at Mayo Clinic and Baltimore VA Medical Center.

Mayo's team concluded that it was feasible to perform interpretations of cross-sectional images while using a walking workstation. Their findings were published in 2008.

The VA team saw no significant difference in accuracy. They also reported that radiologist's energy expenditure increased by a factor of 2.5 by using the walk station for a portion of the day. The VA study was presented at the annual RSNA conference in 2008.

*"Feasibility of Using a Walking Workstation during CT image Interpretation"; Jeff L. Fidler MD, Robert L. MacCarty MD, Stephen J. Swenson MD, James e. Huprich MD, Warren G. Thompson MD, Tanya L. Hoskin MS, James A. Levine MD*

*"Treadmill Workstations Get Radiologist Moving" RSNA News March 2009*

## Walkstation at Xcel Energy

Xcel Energy's Denver office had 11 people volunteer to take part in a 13 week Walkstation study. All participants complete both pre-study and post-study surveys which collected individuals' assessments of their overall health status, their health goals, and the work activities that comprised their workdays.

Below are the data results and conclusions shared by Xcel's research staff:

Participant	Health Rating	Weight	Blood Pressure	Energy Level	Body Mass Index	Total Calories Burned	Total Minutes Spent	Total Distance Traveled
1F	0	-8	0	0	-2	3,056	896.27	15.74
1P	0	-6	0	0	-1.4	6,086	1,852.69	63.27
2F	1	-39	-2	1	-6.3	12,220	2,655	39.59
2P	0	0	-2	0	0	1,614.31	827.18	987.42
3F	0	0	0	0	0	1,785	902.42	24.9
4F	0	0	0	0	0	7,893	3,220	102.25
5F	1	-15	-2	2	-2.5	11,705	3,234	306.35
6F	0	0	0	0	0	0	1,107	36.9
7F	0	-2	-5	0	-0.2	3,258	1,512.67	33.56
8F	1	-8	-1	2	-1	8,313	3,222.67	73.33
9F	0	0	0	0	0	5,534	1,842	56.36
<b>Total Change</b>	<b>3</b>	<b>-78</b>	<b>-12</b>	<b>5</b>	<b>-13.4</b>	<b>61,464</b>	<b>21,272</b>	<b>1,740</b>
<i>(Numbers reflect the amount of movement or change in status)</i>							<b>354.53 hrs.</b>	

### Conclusions:

- 1) 27% of the participants reported that their self-reported health rating increased.
- 2) A total of 78 lbs were lost over the course of the program.
- 3) Blood pressure of the participants was collectively reduced by more than 120 points.
- 4) 3 of the participants reported an increase in their energy level by 1 or 2 levels.
- 5) The BMI (Body Mass Index) of the participants was collectively reduced by more than 13 points.
- 6) Using one hour a day, participants logged enough miles to travel from Denver, CO to Philadelphia, PA.

For further information, please go to the Details website [details-worktools.com](http://details-worktools.com) or call 800.833.0411

P.O. Box 1967 / CD-5E Grand Rapids, MI 49501-1967

©2010 Steelcase Inc. All rights reserved. 09/10