

Advance Title Information

Sitting Kills, Moving Heals

How Simple Everyday Movement Will Prevent Pain, Illness, and Early Death — and Exercise Alone Won't

by Joan Vernikos, Ph.D.

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Numerous medical studies have proven that sitting too much shortens lifespan, even in people who exercise regularly, but what's the reason? In *Sitting Kills, Moving Heals*, Dr. Joan Vernikos, former director of NASA's Life Sciences Division, presents a comprehensive scientific explanation for why Americans are so unhealthy — and delivers the solution, an easy-to-follow, scientifically proven plan to restore Americans' health.

In *Sitting Kills, Moving Heals*, Vernikos uncovers the unsuspected medical connection between the health dangers of weightlessness in space and the chronic diseases caused by sedentary lifestyles here on Earth. In her research at NASA, Vernikos discovered that movement that resists the force of gravity is essential to good health. In weightlessness, astronauts, who are far fitter than the average adult, seem to rapidly age; their muscles, bones and overall health degenerate to levels usually seen in elderly people. Vernikos found that keeping subjects resting and immobile — an extreme form of the typical American lifestyle — caused the same health problems as extended weightlessness.

Sitting Kills, Moving Heals shows that the key to reversing the damage of sedentary living is to put gravity back in your life through frequent, nonstrenuous actions that resist the force of gravity throughout the day, 365 days a year.

Better than an exercise or diet plan, *Sitting Kills, Moving Heals* gives readers a blueprint for transforming their lives with everyday healthful activity. The *Sitting Kills, Moving Heals* method is fun, easy to follow, takes no time commitment — and it works, giving far better results than conventional diet and exercise plans.

Sitting Kills, Moving Heals is a landmark book that explains why the obesity epidemic is happening and gives ordinary people the knowledge and weapons to fight it and win a lifetime of good health. This is a must-read book for all people who care about their health and the health of their loved ones.

Audience: Health and fitness readers, senior citizens, parents, office workers and others with sedentary lifestyles, medical professionals, sports and fitness professionals, and everyone who wants a long healthy life.

About the Author: Joan Vernikos, Ph.D., the former director of NASA's Life Sciences Division, is a pioneer in space medicine research and a leading researcher in health aging.



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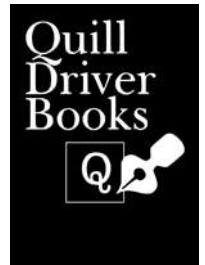
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Your chair is killing you! New book *Sitting Kills, Moving Heals* is a wake-up call to sedentary Americans

NASA life scientist explains alarming correlation between sitting and early death; gives an easy-to-follow action plan to reverse the health damage of sedentary living

You've seen the recent medical news — a number of new scientific studies have consistently shown that too much sitting will shorten your life, even if you exercise regularly. Americans have struggled for decades to exercise more and eat less, but one thing hasn't changed: we still spend hour after hour each day virtually immobile in our chairs, and we're fatter, sicker and more tired than ever before. The way we live is killing us, and we can't seem to stop it.

In her new book *Sitting Kills, Moving Heals: How Simple Everyday Movement Will Prevent Pain, Illness, and Early Death — and Exercise Alone Won't* (Quill Driver Books, December 2011), Dr. Joan Vernikos, former director of NASA's Life Sciences Division, presents a comprehensive scientific explanation for why Americans are so unhealthy — and delivers the solution, an easy-to-follow, scientifically proven plan to restore Americans' health.

Vernikos' pioneering medical research for NASA documented the systemic damage that weightlessness inflicts on astronauts' muscles, bones and bodily systems. In *Sitting Kills, Moving Heals*, Vernikos uncovers the unsuspected medical connection between the health dangers of weightlessness in space and the chronic diseases caused by sedentary lifestyles here on Earth, where sitting most of the day nullifies the healthful and invigorating benefits of resistance to gravity that the human body was designed for. There is no doubt — too much sitting results in obesity, physical decline, decrepitude and early death.

In her groundbreaking research at NASA, Vernikos discovered that living with constant resistance to the force of gravity is essential to good health. In weightlessness, astronauts, who are far fitter than the average adult, seem to rapidly age; their muscles, bones and overall health degenerate to levels usually seen in elderly people. Searching for a way to duplicate this degeneration in volunteer medical subjects on Earth, Vernikos found that keeping subjects resting and immobile caused the same health problems as extended weightlessness.



Vernikos' NASA studies are the only research that has provided a complete explanation for why sitting is so bad for health. Excessive sitting, like extended weightlessness, removes the body from its natural condition of constantly resisting gravity. Being weightless rapidly ages the body; staying immobile has the same effect as being weightless; and therefore modern American sedentary lifestyles promote rapid aging and poor health.

People in the developed world, who work at desks, watch TV, and move far too little, have experienced a steady increase in serious illnesses such as obesity, diabetes, heart disease, osteoporosis, muscle wasting and arthritis, balance and coordination problems, poor sleep, and lack of stamina. These disorders, once believed to be consequences of aging, are now appearing much earlier in life — even in children, who are increasingly glued to different forms of sedentary electronic entertainment. Traditional exercise doesn't help. Even the most strenuous gym workouts don't solve the underlying health problems of people who, like most Americans, spend over half their lives sitting. Vernikos' studies of both astronauts in space and test subjects on Earth shows exercise is never more than partially effective in keeping muscles and bones from wasting.

A Prescription for Lifelong Health

There is good news: Astronauts can be quickly restored to full fitness by returning to active life on Earth, and so can you. *Sitting Kills, Moving Heals* shows that the key to reversing the damage of sedentary living is to put gravity back in your life through frequent, nonstrenuous actions that resist the force of gravity throughout the day, 365 days a year. Vernikos' easy-to-follow method of incorporating "G-Effective Activity" into everyday life will improve health, increase fitness, and even delay the effects of aging.

Different from an exercise or diet plan, *Sitting Kills, Moving Heals* gives readers of all ages a simple blueprint for transforming their lives with everyday healthful activity. The *Sitting Kills, Moving Heals* method is fun, easy to follow, takes no time commitment, can be practiced at home or at the office — and it works, giving far better results than conventional diet and exercise plans. A lifetime of vitality and freedom is possible through an applied knowledge of gravity.

Sitting Kills, Moving Heals is a landmark book that explains why the obesity and diabetes epidemics are happening and gives ordinary people the knowledge and weapons to fight it and win a lifetime of good health. This is a must-read book for all people who care about their health and the health of their loved ones.

Book Details:

Title: *Sitting Kills, Moving Heals: How Simple Everyday Movement Will Prevent Pain, Illness, and Early Death — and Exercise Alone Won't*

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About Dr. Joan Vernikos

Author of *Sitting Kills, Moving Heals*

Joan Vernikos, Ph.D., is a pioneering medical research scientist who has conducted seminal studies in space medicine, inactivity physiology, stress and healthy aging. Born in Alexandria, Egypt, in 1934, Vernikos received her Ph.D. in pharmacology at the University of London. Vernikos became a researcher at the NASA Ames Research Center in 1964. She was a foundational figure of space medicine research and served as Life Sciences Director at the NASA Ames Research Center from 1986 to 1993 and Director of the Life Sciences Division at NASA headquarters from 1993 to 2000.

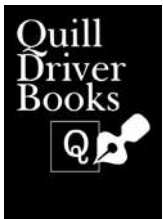
In her research at NASA, Vernikos spearheaded groundbreaking medical studies on the effects of weightlessness on health. Vernikos' NASA research on the health effects of weightlessness helped establish the scientific causal relationship between sedentary living, rapid aging and poor health, and played a key role in Senator John Glenn's return to space flight at age 77 in 1998.

Vernikos has held numerous academic posts as a lecturer and professor in life sciences and medicine. She is twice winner of NASA's Exceptional Leadership Award, and has also received NASA's Scientific Leadership Award, the Melbourne Boynton Award from the American Astronautical Association, the Strughold Award in Space Medicine from the American Aerospace Medical Association, the Jeffries Award from the American Institute of Aeronautics and Astronautics, the Lifetime Achievement Award from Women in Aerospace, and numerous other academic and scientific awards.

Vernikos is a member of the International Academy of Astronautics, a research fellow of the International Strategic Studies Association, a fellow of the National Academy of Sciences-National Research Council, a fellow of the Aerospace Medical Association and a fellow of the World Economic Forum.

Vernikos is also a prolific journalist and science writer. She has written about space, defense and foreign affairs, medicine, health, stress, aging and physical fitness for numerous scientific, academic and popular publications, including *Defense & Foreign Affairs*, the *New York Times*, *Popular Science*, *Muscle and Fitness*, and *Gerontology*.

Vernikos has written three previous books: *Inactivity: Physiological Effects* (1987, co-written with Harold Sandler), *The G-Connection: Harness Gravity and Reverse Aging* (2004) and *Stress Fitness for Seniors* (2009).



For more information on *Sitting Kill, Moving Heals* (Quill Driver Books, December 2011) or to arrange an interview with author **Dr. Joan Vernikos**, please contact Jaguar Bennett at Quill Driver Books, Publicity@QuillDriverBooks.com, (800) 345-4447.

How can we be deprived of gravity on Earth?

Excerpted from *Sitting Kills, Moving Heals*

By putting together all the consequences of gravity deprivation in astronauts, I realized that I had come across this mix of symptoms, or “syndrome,” before. They are common features we identify with someone old and frail, those who are bedridden because of an injury or suffering from a wasting disease such as AIDS/HIV or a long-term infection.

The following table compares the changes we observe in astronauts in space to physiological changes in sedentary adults:

Astronauts in Space	Changes on Earth with Age
aerobic capacity decreases by 25% in 7–14 days	aerobic capacity decreases 10% per decade
plasma volume decreases by 10–20% in 7–90 days	plasma volume decreases by 0.5–1% per decade
bone density decreases by up to 5 % per month	bone density decreases by 1% per year
muscle mass decreases by 1% per month	muscle mass decreases by 1 % per year
muscle strength proportionately reduced	muscle strength proportionately reduced
flabby muscles	flabby muscles
fetal/curved stance	stooped posture
reduced force, explosive power	reduced force, explosive power
abnormal reflex patterns	abnormal reflex patterns
increased fatigability	increased fatigability
decreased cardiac output	decreased cardiac output
decreased heart stroke volume	decreased heart stroke volume
slower movement and reaction time	slower movement and reaction time
increased body fat replaces muscle	increased body fat replaces muscle
reduced sensitivity to insulin	reduced sensitivity to insulin
decreased testosterone	decreased testosterone
decreased growth hormone	decreased growth hormone
aching joints	aching joints
loss of collagen	loss of collagen
tender soles on return from space	tender soles on getting out of bed
sluggish gut, slower gut transit time and absorption, possible urinary incontinence in women post-flight	sluggish gut, slower gut transit time and absorption, urinary incontinence

REDUCING GRAVITY ON EARTH

In the early years of the space program, we needed to find a way of studying the effects of spaceflight in healthy human volunteers on Earth. But how could we manage this when we are surrounded by gravity?

The clue to finding a better research model was very basic: recall that gravity exerts its maximal influence on the ground when we are standing up. When we lie down, the influence of gravity is reduced to pulling only across the chest. We developed the following research procedure: Young men and women volunteered to lie in bed continuously for these studies. They were screened by doctors to be healthy and fit, and their age — 30 to 50 — matched that of our astronauts. Sure enough, living in bed induced the same changes we had seen in astronauts returning from space, though they were slower to develop in bed. And like returning astronauts, our volunteers recovered once they got out of bed and back on their feet and began moving about.

SLIPPERY SLOPE STARTS AT 20

We start using gravity less whenever development peaks — on average around age 20. Think of how active and energetic you were as a child: running, jumping, skipping rope, swinging on a swing, hanging upside down. Then, as an active teenager, you may have spent many hours playing football, baseball, tennis, swimming followed by partying into the wee hours!

But, for the typical adult in a so-called developed country, what follows high school graduation is work or college. With that comes hours of sitting. The average office worker spends 6 hours a day sitting. Whether due to studying, attending classes, working in an office, in front of a computer, away from organized sport opportunities and with new worries and responsibilities as simple as taking care of their own needs — remembering when to do what, food, lodging, laundry — the level of activity takes a nosedive. Add to that food that is not home-cooked, readily available, cheaper — unavoidably high in carbohydrates and fats — and the slippery slope toward gravity deprivation becomes steeper every day.

In the last century, gravity deprivation syndrome (GDS) symptoms first became obvious after 50. As a child I remember thinking people in their 30s and 40s were old. AARP, when first formed in 1958, defined a senior at age 55. Using more sensitive techniques, we can detect subtle GDS changes as early as in the 20s.

Both in space and in bed rest, the heart muscle atrophies as well. Not unlike the rate of loss of skeletal muscle in space or bed, intensive care patients lost 1 percent of heart muscle per week.

The calculated loss of cardiovascular function in three weeks of lying in bed in young men as measured by their aerobic capacity (VO₂max) is equivalent to that seen over 30 to 40 years of aging.

You can slow down this rate. It's in your hands ... and in your legs and in your head! The sooner you start the better. It is never too late.

TODAY'S CHILDREN ARE AT GREATER RISK

Development may peak earlier than 20. If for a variety of reasons the rate of development has been compromised, peak development would be reached earlier and would be lower. This means that assuming optimistically the same average decline in the use of gravity after an earlier peak development, these children will reach their risk zone earlier. This is not a myth; it is unfortunately reality. Although the availability of better treatments has reduced heart disease in the US in the last 30 years, Type 2 diabetes, heart disease and stroke — once rarely seen in people under 60 — are now occurring in those under 50, and younger.

Teens are now showing these conditions as well. Lower peak development could be the result of malnutrition, lack of a nurturing environment, more sedentary time or poor general hygiene conditions. In my view, gravity deprivation is a major factor in this trend, especially in the U.S. and the rest of the developed world.

Even if early development has been healthy, modern living conditions, as well as the school environment, conspire to encourage a more sedentary childhood. A 10-year-old boy in the audience of a talk I recently gave to parents and children at an Elementary School in Manassas, Virginia, when asked what his favorite game was, replied “Game-Boy” — not football or baseball or some other sport.

Sitting in front of a computer is encouraged and common both in schools and at home. I have met Board of Education members who vehemently deny there is any relationship between physical activity and a healthy brain. Citing budget constraints, many schools have cut back not only on after-school sports, but also on daily physical education classes. A recent report from Cornell University analyzed 1999, 2001, and 2003 data on

students' exercise habits. The data came from surveys from the Center of Disease Control of 37,000 high-schoolers. The report found that in the typical high school gym class, students were active on average for only 16 minutes. Yet the National Institutes of Health recommend that all children get at least 60 minutes of vigorous physical activity per day; this would include running, bicycling, swimming, and other active sports. It also recommends no more than 2 hours per day of "recreational screen time" — leisure time spent sitting at the computer or watching television or movies.

Even in those schools that do have gym classes, much time is spent changing clothes or participating in a team sport like baseball or softball where, unlike soccer, most players stand by waiting for their turn. If physical activity is included in schools as the data indicate, it should be at all levels from 5 years on. It must be structured to provide in the short time allocated as a near maximal effort for each student.

Using a little creativity to incorporate gravity-using habits into the school day would be a painless basic activity bonus. For example, standing up at the beginning and end of each class for 14 to 16 posture-changing stimuli per day would go a long way toward boosting students' cumulative physical activity. Did you know that this is an important gravity-using habit that our grandparents made as a sign of respect for their teachers? In fact, President Nicolas Sarkozy has urged that standing up when a teacher enters and exits the classroom should be re-introduced in France as a means of restoring respect for teachers into schools. Little does he know how physically beneficial such posture change is to the health of the students!



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Your Action Plan

Excerpted from *Sitting Kills, Moving Heals*

We've all heard of exercise routines, diets and financial plans that promise to change our lives for the better in just 30 days. And most of us have seen these plans fail or bring initial results that are hard to keep up. The good news is that, when it comes to gravity and the benefits it brings, you don't have to disrupt your life or schedule. There are unlimited opportunities for fitness all around us. Clearly the answer lies in restoring the amount of natural, habitual physical activity we do throughout the day, every day of our lives: perpetual motion. But how?

TURN ALL DAY NATURAL NON-EXERCISE ACTIVITIES INTO G-HABITS

Habitual movements are the most important thing you can do. It is the primary type of activity you need to work on. Even if you exercise regularly at the gym, pay attention to your habits when you are not exercising, for they benefit your body in different ways. If your life and work are such that you cannot get away to exercise, do not enjoy playing a sport, and spend much of your day sitting in an office or a car, all is not lost. This is all the more reason why you will derive benefits from restoring gravity habits — G-Habits — back into your life. You had these habits as a growing child, so it's simply a question of getting them back.

Tip: Exercise is not a substitute for activities that come naturally throughout the day, 365 days a year, for the rest of your life.

Gentle movements that challenge gravity's direction and acceleration, and all strength-oriented moves as well, specifically work to develop those precious maps in your brain that control balance and coordination. This process takes time to develop. Do not expect overnight results. Eight to 12 weeks is a more likely time frame. Do not try to work on too many new habits at the same time. Work incrementally. That is the key to lifelong success because the object is to acquire, restore, or rediscover life-long habits. Such habits must be realistic to fit into different lifestyles. Only when an activity becomes a habit will it become part of your daily life, rather than a chore, like medicine that must be taken.

DEFYING GRAVITY STABILIZES THE BODY

For optimal effectiveness, the intensity of your G-habits should be low. Traditionally, exercise has focused on mobilizers and neglected the importance of stabilizers. For many people this has resulted in chronic pain, mostly back pain. When stabilizers atrophy as they do in our modern sedentary lifestyle, mobilizers cannot function properly because they lack a firm base from which to work. The consequence of this is instability of segments of the body, distorting the movement and causing lower back pain or potentially injurious falls.

Stabilizers are meant to provide the stable basis from which mobilizers can work to prevent wear and tear of the body. To stand still you do not need mobilizers, but you do need stabilizers. Among the styles of exercise we typically see today, Yoga and Tai Chi — which, you will note, are ancient forms of activity — are the excep-



tions, as they target mainly stabilizers. Maintaining fitness of stabilizers by continuous low intensity activities forms the foundation of a healthy, active body. Acquiring all-day repetitive, sustained, low-intensity habits is nature's way of not allowing the stabilizer system to weaken.

Then gravity comes to the rescue. For example, every time you stand up from a sitting position, you are moving your entire upper body against gravity. You may want to begin by consciously counting how many times a day you stand up. Then set a target and work up to it. Make it fun by counting down from your target number like a space rocket lift-off — 36, 35, 34 ... you will find it probably takes most activities at least a week or two to become habits whose repetitions you no longer need to count. There is no end to the number of new habits. Some, like stretching and standing up, you must do every day. Others, like housecleaning, gardening, or sport will be done less often. Introduce new habits day by day. If you get stuck about wondering what else you can do, be a child again. Play. Make them fun. Take stock in how much better you look and feel so that you reach the point, just as with brushing your teeth, where you cannot conceive of life any other way.

By Star Rating habits, activities and exercises (like the star rating system for hotels and restaurants), I've indicated which are of the most benefit. And for those of you who are used to thinking in terms of calories burned, I also give you an estimate of the energy value of each move as total calories burned or calories per hour for a 120 to 140-pound person. If your weight is different, divide the calories burned for each activity by 130 and multiply by your body weight in lbs to get the calories you would burn. You will notice that calories do not always correlate with gravity-value star-rating. Both are important for good health and fitness. Expressed as calories per minute or per hour, you would need to calculate the duration of each activity to estimate how many calories were burned. For instance, carrying bags of groceries to your car uses up the same number of calories/hour — 180 — as carrying a baby around in a sling or backpack, but you would likely spend only a few minutes carrying the groceries, whereas many new parents carry their baby for an hour or more at a time.

G-HABITS ARE NON-EXERCISE ACTIVITIES

Healthy seniors seem to have benefited from G-habits perhaps because they retain those activities that target the stabilizer muscle system. Think of your grandmother or aunt who would never ignore a speck of lint on the floor, but quickly bent over to pick it up. "She has always hated exercise," says Elsa, describing her vigorous 92-year-old mother. "But she is always getting out of her chair to get something from the kitchen, straighten the afghan on the sofa, putter with her plants. Even riding in the car she never sits still, she's always fidgeting with her hair or her purse or the seat belt. In an everyday conversation, she's the type who couldn't talk if she didn't wave her hands."

There are innumerable core habits we all do at one time or another, the most obvious being light housework like vacuuming (**) that is good for 200 cal/hour. More strenuous activities like raking and picking up leaves and shoveling snow (****) could be worth up to 350 cal/hour. Milder gardening, pruning, planting, weeding, and mowing (* to ****) could be worth 300–350 cal/hour and increase stamina as well as working long-neglected muscles. Less strenuous is a stand-up stimulus, say, to get a glass of water — but this simple effort yields tremendous gravity value (****; 10–15 cal). You might also carry a baby (**; 180 cal/hr), stir a large pot of Sophia Loren's pasta sauce recipe (**; 132cal/hr), roll out cookie dough (**; 132cal/hr), crack nuts (*; 100cal/hr), or carry your grocery bags to the car (**; 15cal). Take the garbage bin out (**; 18 cal), paint a room (****; 270-350cal/hr), scrub the bathtub (**; 160cal), paint your fence (****; 300–350cal/hr), grow

your own vegetables (**; 100-150cals/hr).

In many cases you can vary how you do these activities — doing each move such as standing up or sitting as slowly as you possibly can — to make them harder to do and gives you greater G-value. Addressing these activities from a gravity perspective should help you focus on what you're doing and why it is important to your health.

Get back into the Stretching Habit *****

Muscles/ Joints/ Ligaments/ Tendons/Bones/ Spine/Neck/Shoulders/Feet (100cals)

We think of a child waking up with a good stretch. Cats and dogs do the same thing, but many of us just stumble out of bed when the alarm goes off. As you age, or if you have stopped stretching at any age, your muscles tighten and the range of motion in your joints decreases. This can put a damper on active lifestyles and even hinder day-to-day, normal motions. Tasks that used to be simple, such as zipping up a dress or reaching for a jar on the top shelf, now become extremely difficult. The AARP's driving course for seniors includes stretching exercises as a safety precaution. Many elderly drivers lose their range of motion so that they cannot rotate to look behind them when backing out of a parking space or driveway — the result is often an accident! A regular stretching program can help lengthen your muscles and make daily living activities easier.

Tip: Do not bounce when you stretch, as this can put strain on tendons and joints. Extend the stretch as far as you can and hold it, continuing to breathe naturally. You may use a timer or a clock that displays seconds to time your stretches — 30 seconds is good, 60 seconds better.

Stand Up: Sit Down *****

Blood Pressure Control/Muscles/Joints/Bones(2cals/min)

If you do nothing else, this is the single most important habit you can acquire. The key to independence in old age is being able to stand up. Start practicing now so you will be able to stand up and sit down without help for as long as you live. Do this exercise correctly to get the most out of something easy and simple. From a using-gravity perspective, standing up is excellent, especially if you raise your weight out of the chair slowly and repeat it many times throughout the day. If you stand up fast the same number of times, but in a short period, it is an aerobic exercise — note how your heart beats faster and you pant.

Research predicts it would take at least 32 posture changes from sitting to standing and back again to maintain healthy blood pressure regulation. I know this for a fact from my studies with volunteers lying in bed continuously, 24 hours a day for 4 days. It took 16 times a day of standing up from bed to prevent the tendency to faint when they got up. That means it took that many changes in posture to maintain the blood pressure sensors tuned. It would take as many as 32+ times of standing from sitting, since that is a smaller change in the gravity stimulus than it is from lying down to standing. Consider 32 your lowest goal. More will not hurt you, though less may not produce the desired effect.

(a) On the Way up you defy gravity. How do you get out of your chair? Do you lean on the arms of the chair? Do you lean on your knees? Create opportunities to get up often — for example ask a neighbor to ring your doorbell and say hello as she goes by. Stay away from your cell phone, or dock your mobile phone so you have to get up to answer it. When watching TV, get your own drink. Drink plenty of water so that you must use the bathroom often.

Tip: When I recommended frequent standing up at one of my talks, a man in the audience complained he could not do that because he worked all day with a computer. If he stood up every so often his boss would fire

him. Asked whether he drank water, he replied, “Yes, of course. I have a bottle on my desk.” “Put it on a shelf just far enough so that you have to stand up to reach it!” It does double duty keeping you toned and hydrated.

Aspire to stand up without leaning on anything. However, even if at first you do use furniture for support, you are strengthening the arms. Once standing up without support is mastered, do it very slowly to perfect it. Then try getting up from a low armchair or sofa without the help of the firm seat. That adds challenge to this habit.

Stretch at Your Desk *****

Posture/ Shoulder Blades/Lift Chest/Tension Relief (1 cal/min)

As you work at your desk, hold your head high away from your shoulders. Make sure you are not dropping it forward. Bend your left arm behind your back to grab the elbow of the right arm held straight down beside you. You will immediately feel your shoulder blades come together, your shoulders go down and your chest rise. Hold as long as you can. Alternate arms. Repeat often. It releases shoulder tension as well as strengthening the good posture habit. Grasping your hands behind your back can also help you relieve the tension in your back.

Here is another easy variation as you work: keeping both arms against your sides bent at the elbow, move the elbows backward bringing your shoulder blades together. Hold it. When you become good at it, you can work on your keyboard in this position. This stretch is also great on long flights or when waiting at traffic lights. If you make this move often while you work at your desk and while you sit at traffic lights holding your shoulders down, you will greatly reduce your risk of suffering from a stiff neck and shoulders.

Walk Tall *****

Posture/Balance/Spine/Neck Muscles (150-350cals/hr)

When you walk, remember that toddlers and astronauts returning to Earth walk with their legs far apart to keep from falling. Keep your sense of balance strong — and move like a runway model — by walking with your legs and feet close together. Aim to keep your gaze ahead rather than at your feet. This will help you walk taller and keep your spine strong.

A brisk walk in a park or other pleasant surroundings can be emotionally rewarding, too. If you take an hour to walk 2 miles you will burn 144 to 168 calories for a 120 to a 140 lb person. On the other hand, a brisk or power walk of 2 miles in 40 minutes burns 192 to 222 calories, depending on your weight. If you want to burn twice as many calories for the same distance in the same time, try carrying a backpack — but whatever you do, be sure to walk tall. The emphasis is on moving briskly and with purpose. Why brisk? Think back to Chapter 3 and the value of intermittent, low intensity, high frequency movement. Walking is a series of intermittent steps each one generating a vertical gravity stimulus by its impact. The faster you take those steps the higher the frequency.

Former astronaut and U.S. Senator John Glenn who is now well into his 80s, makes a habit of power-walking two miles a day. He works with weights as well three times a week. Power-walking is covering more ground in less time while swinging your arms out at the same time. Glenn started doing this long before a recent study showed that gait speed — how fast you walk — helps you live longer. The study concluded that the ideal for people over 65 was walking 2.25 miles in one hour every day. As I write this, John Glenn is 87 and still going strong. He must be doing something right!

The Stairs Option ***

Balance/Coordination/Muscle/Bone/Joints (8-10 cal/min)

Start off by taking the easy way up — elevator, escalator — and using the stairs going down.

Going up stairs and down are two separate kinds of activities. Going down has a greater balance component; in addition, the impact loading with each step as you accelerate forward provides gravity stimulus to your leg, hips and lower spine bones. Going up is more of an aerobic activity and builds stamina. It is also weight-training as you pull your weight up each step. Both up and down are great exercises to strengthen muscles, but they work on different muscles, so you need to strengthen both the front and back leg muscles — eccentric and concentric.

a) Down — I was amazed at how early balance problems appear, especially in women. Ask young women in their 20s whether they need to look at their feet going down the stairs and you will be surprised to find how many do. Many also hold onto the rail. In my personal poll of young receptionists, a quarter of them said they looked at their feet and about a tenth did both. What do you do? If you are unsteady on your feet, wait until you get stronger to try this, or start off holding the rail. Put on a pair of low-heeled, comfortable shoes and test yourself. If you hold the rail, try to barely touch it until you acquire the confidence to do without it. Instead of keeping your eyes on the stairs all the time, try to look ahead a few steps at a time as you descend. If you find this difficult, build up to it by stepping on and off a low step-stool while alternating feet. Once you master that, check the stairs again. Then work on increasing the number of flights and on letting go of the rail. Your goal is to descend an entire flight without looking at your feet and without touching the rail. Evaluate yourself using the scale in the book *Age-Defying Fitness* .

Many older persons avoid leaving their homes because they are afraid of falling when stepping up onto a bus, or even into an SUV-type vehicle. This step-stool exercise can help them regain their confidence and independence by strengthening the necessary muscles and their sense of balance in the safety of their home.

Tip: Did you know that going down stairs is a more effective bone stimulus than walking? That is because you generate more G impact and stretch your tendons more with every step down.

b) Up — Add going up to coming down. Climb stairs till you are just out of breath. Now let go of the rail and look straight ahead, not down at the stairs. Then increase the number of flights. If you don't have too many flights to climb, take every opportunity to choose the stairs rather than the easier method.



For more information on *Sitting Kill, Moving Heals* (Quill Driver Books, December 2011) or to arrange an interview with author **Dr. Joan Vernikos**, please contact Jaguar Bennett at Quill Driver Books, Publicity@QuillDriverBooks.com, (800) 345-4447.